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INTERNATIONAL ASSOCIATION
OF
MEDICAL MUSEUMS

BULLETIN

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Bulletin No. 1, of the
International Association of Medical Museums.

Washington D. C., May 15, 1907.

CONTENTS:

Introductory Statement.
Proceedings of the First stated meeting of the Association.
List of members of the International Association of Medical Museums.
Appeal for specimens for the McGill Medical Museum.
Announcements.

INTRODUCTORY STATEMENT.

The important functions of the Medical Museum as a compendium of scientific facts, a storehouse of material for research-work, and as a teaching medium are, on this continent especially, comparatively little appreciated. In many places a wealth of pathological material goes its way quite unused and is lost, while in others it indeed reaches a museum, but is placed there without special direction, becoming of relatively little value except to the very few. Even the height to which the "Clinical Museum" is pushed in England, is not the best that might be attained. Here, as in all other departments *organization* is needed to bring the Medical Museum to its highest development. To promote and encourage the building up of collections in localities where, in the presence of a rich pathological material, a Museum does not yet exist; to foster the growth and extend the scope of existing Museums, by facilitating the interchange of specimens along special lines; to aid such institutions as are labouring under unfavorable conditions, and difficulties; to increase the usefulness of the organized Museum as a teaching medium and both by improved methods of classifying and cataloguing and by the proper preservation of specimens to develop such to their highest points :- These are the functions of the newly-organized Association of which this Bulletin is the organ. The great waste of pathological material that occurs in some of our Institutions to-day, and the limitation of the usefulness of many Museums where the material available is necessarily restricted by local conditions, must be so manifest to all workers, that the necessity for the formation of a special Association and the issuing of these publications need not be dwelt upon.

The movement to form an International Association of Medical Museums took form during the winter of 1906. Preliminary meetings for the purpose of organization were held at Washington, D. C., and Baltimore, May 15th and 17th, 1906, when an organizing Committee was formed to whom was entrusted the work of enrolling members and of formulating a Constitution. This Committee circulated a letter of invitation to membership, among the leading Medical Museums throughout the World. In this Circular it was laid down, that only active workers connected with leading Medical Museums should be admitted to membership, and the International character of the Association and the importance of its function as a medium for the interchange of Museum material, were insisted upon as its most essential principles. It was stipulated that the business of the Association was to be conducted chiefly by means of correspondence, and the meetings were to be held triennially at Washington, in connection with the Congress of Physicians and Surgeons, unless otherwise specially arranged; in this way it was thought to forestall and obviate the objections likely to be raised to the formation of a new Association with obligate annual meetings in these days of an over-organized profession.

The first meeting of the "International Association of Medical Museums" has just taken place in connection with the Medical Congress here, and was most successful. A full report of the meeting is given below. An Association that we feel is urgently needed is now fairly launched and the first fruit of concerted action is the issue of the present Bulletin, one of the main objects of which is the announcement of the losses by fire sustained by the McGill University, Montreal, Canada, when the fine Pathological Museum was in large part destroyed. Full particulars are given below, and it is earnestly hoped that the Institutions comprising this Association will do their utmost by the contribution of the pathological material that is needed, to restore this Museum to its former high usefulness and value.

REPORT OF THE FIRST STATED MEETING OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

A meeting of the Organiz~~ed~~ing Members of this Association, was held at the Army Medical Museum, Washington, D. C., on May 6th, 1907, at 3 P. M. In the absence of Dr. James Carroll through illness, Dr. W. G. McCallum, of Baltimore, occupied the Chair. There were present Dr. Osler, Captain Russell (representing Colonel Havard), Drs. Wesbrook of Minn., Francis C. Wood of New York, Warthin of Ann Abbor, Mich., J. J. MacKenzie of Toronto, Canada, Pearce of Albany, Lamb of Washington, D. C., Souchon of Tulane University, New Orleans, La., Healy of Washington, D. C., White of Minn., W. G. MacCallum of Baltimore, M. E. Abbott of Montreal, Canada, and Albert of Iowa.

Dr. MacCallum stated that the meeting had been called by Dr. Carroll, Chairman of the organizing Committee, for the purpose of taking the formal steps in organizing the Association. The preliminary circular which had been issued by the Committee, setting forth the aims and proposed principles upon which the Association should be framed, was read and discussed.

Some difference of opinion was expressed upon Arts. 2 and 5 of this Circular, which provided that Active Membership be limited to one representative from each Museum, and that there shall be also an Auxiliary Membership open to all persons actively engaged in Museum work, who may take part in discussions, etc., but shall not vote. It was felt that while one representative only from each Museum should have the privilege of voting, as many members as possible should be included, irrespective of the Institution to which they belong, provided only they be active workers along Museum lines, and of good professional status. And that the term Auxiliary is not suitable to apply to such members, who may in many cases be the heads of Departments in their University. Dr. MacCallum therefore, suggested : That the active membership be practically unlimited, but that a single vote only be permitted to each Museum, and that the Council of Administration be formed by these voting repesentatives, one from each Museum admitted to the list.

This suggestion was referred to the Committee on organization for their serious consideration.

The Committee on organization, Drs. Carroll, MacCallum, and Abbott, were empowered to continue in action, and to frame a Constitution and By-laws which should be submitted by them to every active member, and should be adopted only after the approval of all the voting representatives in writing had been obtained.

The list of organizing members was circulated, and it was resolved that all applications for active membership received from abroad and dating not later than this day, shall be included among the organizing members.

THE FOLLOWING OFFICERS WERE ELECTED.

PRESIDENT :

Major Carroll, Amry Medical Museum, Washington, D. C.

FIRST VICE PRESIDENT :

Prof. W. G. MacCallum, John Hopkins Medical School, Balto.

SECOND VICE PRESIDENT :

Prof. J. Ritchie, Oxford University, England.

Third ~~SECOND~~ VICE PRESIDENT :

Prof. J. Ludwid Aschoff, University of Freiburg, Germany.

COR. AND RECORD. SEC'Y AND TREAS. :

Dr. M. E. Abbott, McGill Medical Museum, Montreal, Canada.

Dr. Osler said that he thought a most important action would be taken if this Society could issue a yearly or half-yearly bulletin, of Museum information, pertaining more particularly to the exchange of specimens and publishing a list of duplicates in hand, or of lacunae in the collections, of the different Museums represented in the Association. He instanced a German periodical of this character, as already existing and moved that such a bulletin be issued. The motion was seconded by Dr. Warthin, and carried unamimosuly.

It was decided that the next meeting be held in connection with the Congress of Tuberculosis, in Washington, D. C., in October 1908.

Dr. MacCallum said that he wished to draw the attention of members present to the recent losses by fire at McGill University when the Pathological Museum had been in great part, and the Anatomical Muse- entirely destroyed; and said that the first action of the Association should be to assist by every means in their power in the restoration of this Museum.

LIST OF ORGANIZING MEMBERS OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

1. Army Medical Museum, Washington, D. C., Major James Carroll, U. S. A., *President.*
2. John Hopkins Hospital, Baltimore, Md . Prof. W. G. MacCallum, *1st Vice President.*
3. Oxford University Medical School, Oxford, England, Prof, J. Ritchie, *2nd Vice President.*
4. University of Freiburg, Freiburg, Germany, Prof. J. Ludwig Aschoff, *3rd Vice President.*
5. McGill Medical Museum, Montreal, Canada, Dr. M. E. Abbott, *Secretary and Treasurer.*
6. John Hopkins University, Baltimore, Md., Prof. Wm. H. Welch.
7. Oxford University, Oxford, England, Prof. Wm. Osler.
8. University of Glasgow, Glasgow, Scotland, Prof. Robert Muir, Bathological Museum of the Western Infirmary.
9. McGill University, Montreal, Canada, Prof. J. G. Adami.
10. Jefferson Medical College, Philadelphia, Pa., Prof. W. M. L. Coplin.
11. University of Minnesota, Minneapolis, Minn., Prof. F. F. Wesbrook.
12. University of Toronto, Toronto, Canada, Prof. J. J. MacKenzie.
13. University of Michigan, Ann Arbor, Mich., Prof. A. S. Warthin.
14. University of Pennsylvania, Philadelphia, Pa., Prof. A. J. Smith.
15. University of Chicago, Chicago, Ill., Prof. LeCount.
16. Harvard Medical School, (Warren Anat. Museum), Boston, Mass., Dr. W. T. Whitney.
17. Albany Medical College, Albany, N. Y., Prof. R. M. Pearce.
18. Western Reserve University, Cleveland, Ohio, Prof. William T. Howard, Jr.
19. University of Havana, Havana, Cuba, Prof. John Guiteras.
20. Tulane University, New Orleans, La., Prof. Edmond Souchon.

21. Pathological-Anatomical Museum of the University of Vienna, Vienna, Austria, Prof. Dr. Anton Weichselbaum.
12. University of Nebraska, Lincoln, Neb., Prof. Henry B. Ward.
23. University of Birmingham Pathological Museum, Birmingham, England, Prof. R. F. C. Leith.
24. Pathological Museum of the University of St. Andrews, Dundee, Scotland, Prof. L. R. Sutherland.
25. Medico-Chirurgical College, Philadelphia, Pa., Prof. Joseph MacFarland.
26. Pathological Institute of the University of Geneva, Geneva, Switzerland, Prof. Dr. M. Askanazy.
27. Pathological-Anatomical Museum, University of Copenhagen, Copenhagen, Denmark, Prof. Johannes Fibiger.
28. Cambridge University, Humphrey Museum, (Pathology), Cambridge, England, Prof. G. Sims Woodhead.
29. University of Berlin, Berlin, Germany, Ludwig Pick, M. D,
    Museum of the Friedrichshain City Hospital.
    Museum of the Frauenklinik.
30. University of Pavia, Museum of Pathological Anatomy, Pavia, Italy, Prof. Achille Monti.
31. McGill University, (Anatomical Museum), Montreal, Canada, Prof. F. J. Sheperd.
32. Museum of the Mater Misoricordiæ Hospital, Dublin, Ireland, Prof. E. J. McWeeney.
33. Government School of Medicine, Cairo, Egypt, Prof. Alex R. Ferguson.
34. Mueum of Pathological University of Melbourne, Melbourne, Australia, Prof. H. B. Allen.
35. Museum of Cooper Medical College. corner Sacramento and Webster Streets, San Francisco, Cal., Dr. W. Ophuls.
36. University College, Bristol, England, Prof. J. Walker Hall.
37. State Cancer Laboratory, Buffalo, N. Y., Dr. Harvey R. Gaylond.
38. College of Physicians and Surgeons, New York, N. Y., Dr. Francis Carter Wood.
39. University of Iowa, Iowa City, Prof. Henry Albert.
40. Charing Cross Hospital Museum, London, England, Prof. William

Hunter.

41. Army Medical Museum, Washington, D. C., Dr. D. S. Lamb.
42. Army Medical Museum, Washington, D. C., Dr. D. J. Healy.
43. Pennsylvania Hospital, Philadelphia, Pa., Dr. S. C. Robinson.
44. Boston University School of Medicine, Dr. Watters.

APPEAL FOR SPECIMENS FOR THE MEDICAL MUSEUM OF THE McGILL UNIVERSITY.

In the recent great fire in the Medical Buildings, McGill University, Montreal, Canada, three of the four apartments which constitute the Pathological Museum section, with some two thousand specimens, most of them of great value and beautifully mounted and preserved, were destroyed. The members of the McGill Medical School, are making every effort to retrieve this great loss as far as possible, and the contribution of specimens is earnestly solicited. The cost of transportation of material presented will be paid on delivery by McGill University. Those wishing to contribute please address :

The Curator,
McGill Medical Museum,
Montreal, Canada.

The following is a list of losses sustained and of lacunæ in the collection, which Pathologists are earnestly asked to assist in replacing, by the contribution of duplicate specimens or of material that can be spared from their own Institutions.

1. The entire bone collection,some seven hundred specimens illustrating the entire pathology of the Osseous system, including beautiful series of Arthritis Deformans, Gouty Arthritis, Tuberculous Arthritis, Spinal Curvatures, Charcot's joint, Periostitis, Osteomylitis, Sequestum Formation, Syphilis of bone, Fractures, Dislocations, Congenital Dislacation of the hip, etc. Totally destroyed.

2. The whole collection of Salivary, Biliary, Pancreatic, Ronal, Vesical, Prostatic Calculi and Enteroliths destroyed. The replacement of this section, and of the Osseous system is especially desired.

3. The whole Obstetrical Collection was destroyed, with the exception of a few monstrosities. All specimens of interest, especially those illustrating Placental diesase and Monstrosities, solicited.

4. The whole Gynaecological collection.

5. Anomalies of the heart, especially cases of Stenosis of the Conus Arteriosus of the Pulmonary Artery. (To replace a beautiful series the property of Dr. Keith of the London Hospital Museum, London, England, which had been lent to the McGill Medical Museum for study, and was destroyed.

6. All specimens of Diptheria both Tracheal cases, and cases showing false membrane extending into the Bronchi.
7. All new growths of the Larynx.
8. Casts in Fibrinous Bronchitis.
9. All specimens showing disease of the eye, (a beautiful collection of mounted specimens of the eyeball having been lost.
10. Infarction of organs especially of the lung.
11. Anomalies of the Kidney.

Besides the above, which represents a total loss the McGill Medical Museum needs the contribution of the following conditions:

1. Syphilitic Aortitis.
2. Aneurysms, especially Mycotic Aneurysms.
3. Intestinal and other Parasites.
4. Tropical Diseases.

The value of specimens donated will be greatly increased by the statement of the principal clinical data of the case, especially hospital reference, age, sex, and duration of disease.

ANNOUNCEMENTS.

The annual membership fees ($2.00) for the year ending May 1st, 1908, are now due, and may be forwarded, with the entrance fee to the Association ($2.00), where this has not been paid to the Secretary-Treasurer. Address :

Dr. M. E. Abbott,
Secretary, International Association of Medical Museums,
Pathological Museum,
McGill University,
Montreal Canada.

Members of the Association having duplicate specimens for exchange or who are in need of material to complete the series of their collections are invited to correspond with the Secretary, who will discharge the duties of Editor, upon the subject.

The next Bulletin of the Association will be issued when sufficient material has accumulated.

BULLETIN OF THE INTERNATIONAL ASSOCIATION
OF MEDICAL MUSEUMS.
NO. 2.
JANUARY 15, 1909.

Editorial Notes.

ON THE EXCHANGE OF MUSEUM SPECIMENS.

A previous number of this Bulletin was issued many months ago. It was devoted to the record of the formal proceedings connected with the establishment of the International Association of Medical Museums, and, though a very modest attempt in the way of journalism, is still sufficient to keep these proceedings before us. Even if but imperfectly, this second number shows the Association started upon its work. In issuing it no harm, but some good, may ensue if once again we lay stress upon the various purposes of the Association, namely, by coöperation and interchange to increase the utility of the medical museum as a center both for teaching and for research. In very many respects the medical museum stands apart from other museums; it deals with a limited and very specialized class of objects; very special methods have been developed in order to preserve and present these objects to the best advantage. Thus on the one hand coöperation with the general museums and participation in the movement which helps to unite and to promote the utility of museums in general is calculated to be of little service, and on the other hand the very limited number of those interested in the medical museum in any particular community has militated against the publication of papers bearing upon museum methods in the ordinary medical press. As a result the curator of the medical museum has been largely isolated; he has pursued his own method, or want of method, of preparation, demonstration and classification of the objects under his charge, and, not to describe conditions known to all interested, we may briefly sum up that the result has not been satisfactory. *L'Union fait la force.* The very establishment of our Association demonstrates that there exists a sufficient number of those interested in medical museums, scattered through the medical world, to inaugurate concentrated action, to remove this isolation and to render it possible to publish an unpretentious bulletin devoted in the first place to the publication of papers upon museum methods, in the second to providing a means of interchange not only of ideas, but of material, between the different museums. It is to this latter object that we would specially direct attention.

These first lists of material available for exchange and material wanted (published under the Department of Exchange, page 25) must be regarded as largely tentative. They will, we trust, suffice to indicate to the members of the Association the large possibilities that exist for enriching their particular collections in departments which hitherto have been defective. There is no curator but must lament the abundant material that year after year goes to waste, no one but must recognize how much may be accomplished in utilizing of much of this material by a direct system of interchange. These lists, in short, if they do nothing further, must afford the stimulus for communication between those having common interests and must place our members in touch with one another. We would urge the members of this Association to keep in mind the benefits of this interchange: to direct that when, as so often happens, but one-half, or the smaller part, of a specimen can be utilized for their own museum, the other portions be prepared and preserved simultaneously, and these be set apart upon a special shelf or shelves for purposes of interchange.

ON THE PRESERVATION OF THE RESULTS OF RESEARCH AS MATERIAL FOR MEDICAL MUSEUMS.

The history of the development of museums would be one interesting to trace. They must have begun as the accumulation of all sorts of heterogeneous objects, each finding its place separately in the collection, by virtue of some interest attached to it, or as the result of the craving which possesses many people for gathering together oddities of all sorts. The type of mind of the antiquary is by no means rare, but the value of such a collection to others is problematical. It is, however, no great step from this rather childish way of collecting to that of the person whose interest is in one subject alone, and whose collection may in time come to give a more or less complete representation of what exists as a basis for our knowledge of that subject. This very step almost necessarily involves an intelligent study of the subject and an effort towards making the collection complete, well rounded and, as we have said, representative. Such a collection, for these reasons, is far more likely to be valuable to others than the miscellaneous gatherings of the mere collector.

One may easily understand, however, that if the miscellaneous material be abundant enough, as it usually is in public museums, it is only necessary that the objects should be classified and studied by persons especially interested in order to give the whole collection the added value which inheres in special collections. This, as is well known, is the method employed in all our modern museums of whatever sort.

The collection comes to be a storehouse of material for systematic research,—it resembles the woods and fields of a country whose flowers may be gathered and systematized by botanists of different interests. After their work is finished and its results set in order, the museum is of far greater value as the direct illustration to all who visit it of this systematic study, and may now be regarded not only as a recording, but as a teaching museum.

There is, however, another way in which the usefulness of museums may be developed, both in the way of recording and of teaching. The botanist may study the stages in the growth of the plant he finds, he may make fine dissections to demonstrate their anatomical structure, and he may by ingenious experiments determine new facts as to their functions, their relation to their surroundings and the reactions they would unfold when circumstances of wind and weather affect them. At every stage in his investigations he might pause and record the convincing demonstration by a suitably prepared specimen, which would for all time make plain to those who follow the steps of his enquiry. Such series when prepared by a technical expert to illustrate long known facts are interesting and valuable, but how much more interesting if each investigator could leave the original preparations which convinced him and revealed to him the secrets he has brought to light?

Such a collection could easily be made in each institute where work is in progress,—the museum of that institute would be individualized by its presence and endowed with an historical interest which could not arise from the mere accumulation of chance specimens.

THE LATE MAJOR JAMES CARROLL.

The origin of the International Association of Medical Museums wins dignity from the fact that it was a part of the life work and was one of the latest interests of the late Major James Carroll, U. S. A., Curator of the Army Medical Museum, Washington, D. C., from 1903–1907. Dr. Carroll is best known throughout the scientific world for the heroic part which he took in the discovery, with its far-reaching effects to humanity, of the cause of yellow fever. Himself undergoing inoculation by submitting to the bite of an infected mosquito, he recovered from the severe attack of yellow fever that followed with a permanent cardiac lesion. It was this lesion which seven years later, on September 16th, 1907, led to his unexpected and tragical death, when a man of only 53 years of age.

The formation of an Association of Medical Museums, an idea suggested by the late Professor Wyatt Johnston, of McGill University, several years earlier, was laid before Dr. Carroll of the Army Medical Museum in 1905. Dr. Carroll took up the plan warmly, and, as Chairman of the Organizing Committee, suggested the lines of development that have been followed, while by his personal efforts by correspondence with foreign scientists he extended the membership widely, enlisting for it through his wide influence and high position in the scientific world the coöperation and interest of the leading pathologists throughout the world. Very dear to his heart was the *international* scope of the Association, which character, won chiefly through his efforts, is so well established now. At the first stated meeting of the Association, held in May, 1907, under the cloud of his illness, he was elected President. He died five months later.

Surely an Association born at the inspiration and under the direction of these martyrs of science (for the late Professor Wyatt Johnston was also in the deepest sense one of these) should come to an heritage worthy of its birth — an inheritance of unselfish devotion to the common good, to the furtherance of the mutual knowledge and the common scientific interests of a world-wide membership that knows no barrier of nationality or race or tongue.

PROGRAM AND REPORT

OF THE

Second Meeting of the International Association of Medical Museums

HELD IN THE

NEW BUILDING OF THE NATIONAL MUSEUM,
WASHINGTON, D. C.

October 1st and 2d, 1908, at 2:30 P. M.

PROGRAM.

PART I. THURSDAY, OCTOBER 1ST, 1908.

2.30 P. M.: Reading of Minutes, Transaction of Business, Election of President.

DISCUSSION: On the desirability or otherwise of seeking affiliation with the American Association of Museums. Led by Prof. J. G. Adami.

DISCUSSION: On the methods by which this Association can be made most useful, both to its members by the facilitation of exchange of specimens, issue of a Museum Bulletin, etc., and by the elevation of the medical museum as a teaching medium. Led by Prof. Welch, Prof. Sims Woodhead, Prof. J. G. Adami, Prof. G. A. Gibson, Prof. A. S. Warthin.

DISCUSSION: On the feasibility of establishing an Index Pathologicus. Led by Prof. W. G. MacCallum.

DISCUSSION: On the proposed Constitution of the International Association of Medical Museums.

PART II. FRIDAY, OCTOBER 2D.

Passing of Constitution.

Demonstrations and papers upon interesting specimens, methods of technique or arrangement, as follows:

1. Prof. W. G. MacCallum, Baltimore: On the preservation of results of research as material for medical museums.

2. Dr. M. E. Abbott, McGill University, Montreal: On the classification of museum specimens.
2a. Prof. Arloing et Courmont, Lyon: Demonstration de photographie en couleur de pieces et de coupes microscopiques.
3. Prof. Souchon, New Orleans, La.: Demonstration of a new method for the preservation of permanent color of organs; also of pathological specimens.
4. Dr. Watters, Boston: On a method of mounting museum specimens in gelatin.
5. Mr. E. L. Judah, McGill University: Methods of mounting moist specimens in square glass jars, on frames and under clock glass, etc.
6. Mr. Izzard, Cambridge, England: On a rapid method of macerating bone.
7. Prof. A. S. Warthin, Michigan: Demonstration of a special museum jar.
8. Dr. M. E. Abbott, McGill University: Specimens of anomalies of the heart.
9. Adjournment to the Pathological Museum of the Congress of Tuberculosis, where the following exhibits were demonstrated:
    - New York State Exhibit.
    - English Exhibit: Demonstrated by Prof. Sims Woodhead.
    - McGill University Exhibit: Demonstrated by Dr. Fraser Gurd.
    - Maryland Exhibit: Demonstrated by Dr. Stokes.
    - Exhibit of Bureau of Animal Industry: Demonstrated by Dr. Day.
    - Exhibit of University of Michigan: Demonstrated by Prof. A. S. Warthin.
    - Exhibit of Phipps' Institute, Philadelphia.
    - Exhibit of Boston University: Demonstrated by Dr. Watters.
    - German Exhibit.
10. Adjournment to the Army Medical Museum, where a demonstration of specimens illustrating tropical diseases, with especial reference to amoebic dysentery and infection by the treponemata, will be held.

REPORT.

The second meeting of the International Association of Medical Museums was held in the new building of the National Museum, Washington, D. C., on October 1st and 2d, 1908, in connection with the International Congress of Tuberculosis (meeting September 28th to October 4th).

PART I.

The meeting was called to order on Thursday, October 1st, at 2.30 P. M., by the First Vice-President, Prof. W. G. MacCallum, acting in the place of the President, the late Dr. James Carroll. The minutes of the previous session of the Association were read and approved.

There were present: Mr. Richard Rathbun, of the Smithsonian Institution, Washington; Prof. Johannes Fibiger, University of Copenhagen, Denmark; Prof. G. Sims Woodhead, Cambridge, England; Prof. Edouard Rist, Paris, France; Prof. J. G. Adami, McGill University, Montreal; Prof. E. Souchon, New Orleans, Louisiana; Prof. A. S. Warthin, University of Michigan; Prof. F. F. Wesbrook, University of Minnesota; Prof. Henry B. Ward and Dr. P. G. Woolley, University of Nebraska; Prof. W. McN. Miller, University of Missouri; Dr. James Miller, University of Birmingham, England; Dr. John S. Fulton, of Baltimore; Prof. W. H. Watters, of Boston University; Dr. W. Reid Blair, of the New York Zoological Laboratory; Dr. Higgins, of Ottawa, Canada; Dr. Fraser B. Gurd, Dr. E. Saint-Jacques, and Dr. Maude E. Abbott, of Montreal, and others.

In his opening remarks, Professor MacCallum said that the Association was in the anomalous position of being without a President, and his first action must be to express the deep regret felt by all at the loss sustained by this Association and by the scientific world at large in the death of the late Dr. James Carroll. Dr. Carroll was one of the heroic figures in the history of this country, and the circumstances of his death were peculiarly pathetic. He had been an active worker in this Association, and had had its interests warmly at heart. Very little had been done in it since his death, so that its progress had been largely at a standstill. It was of vital importance to the future of this Association that its organization be completed now, and that it proceed to immediate activity along the many lines of development open to it. The meeting should proceed at once to the election of a new President.

It was moved by Prof. Sims Woodhead, seconded by Professor Adami, that Professor MacCallum be elected President. Carried unanimously.

The program for the day, which consisted of a number of discussions preliminary to the passing of the Constitution, was then proceeded with.

Discussion I.—*On the desirability or otherwise of seeking affiliation with the American Association of Museums,* was opened by Prof. J. G. Adami, who pointed out that there were in existence at the present time at least two general Museum Associations which were most active. The Museums Association of Great Britain publishes monthly the *Museums Journal,* and the younger American Association (organized in 1906) has already brought out an annual report of 187 pages. As union is strength, it behooves us to examine into the aims and objects of these older bodies, and to see whether these are identical with our own, and, if so, whether on this ground we should seek affiliation. What are our objects? They are, first of all, to increase the utility of the medical museum as a force in medical education, to organize, classify, arrange, display in such a way as to attain the best and simplest practical results for teaching purposes. That is to say, our function is primarily educational, and our aim is thus in essence the same as that of the general Museums Associations. From this point of view, we should affiliate. On the other hand, there are certain difficulties in the way. The medical museum may be said to be painfully specialized. Its arrangements must differ in many particulars from those in use in general museums, nor would it be possible to standardize the methods of both. Again, the medical museum appeals to a different class of society, it appeals essentially to the student of medicine, while the education of the general public forms one of the most important functions of the museum of science or art. Thirdly, our wish is to be not merely national, but international in scope; one of our most important functions is to develop a system of interchange between medical museums throughout the world.

Mr. Rathbun, speaking by invitation as a member of the American Association of Museums, first called attention to the objects of that organization, which, as defined by its Constitution, are to promote the welfare of museums, to increase and diffuse knowledge of all matters relating to them, and to encourage helpful relations among museums and those interested in them.

It would thus be seen that this Association, like the one in Great Britain, had been founded on a broad and comprehensive basis, and that all museums, whatever their purpose or relations, are comprehended within its scope. The Association does not deal with scientific inquiry as such, but with the methods and expedients of museum management. It exercises no power, but by communications and discussions seeks to disclose the best courses to pursue in administering upon collections, omitting not even the smallest details. It encourages intercourse and exchanges between museums and museum people; it helps to make known facts which are of mutual interest, and, in brief, to disseminate to all museums a knowledge of the experiences of each of them. Among the many subjects clearly within its province are the preservation and preparation of specimens, their systematic classification and arrangement, their labeling and recording, their installation for public exhibition, the furniture and fixtures necessary for their storage and display, the exchange of material, and, not least important, coöperative measures for securing specimens or preparations whose cost might be beyond the means of any one museum.

Such a general organization as the one here spoken of should surely be as helpful to the medical museum as to the museum of natural history, of anthropology, or of art, and a reference to the membership of both the British and American Associations will show that this fact has been recognized. All museums have kindred interests, and the strongest argument in favor of a combination of all is that it brings together the widest range of experience on which to draw. The big museum has much to learn from the small one, and a museum devoted to one subject should have important matters to impart to those of a different class.

The American and British Associations are both, in fact, international, each drawing its membership from several countries. The only excuse for founding the former was the distance across the Atlantic and the rapid development of museums in the New World. This country will continue its hearty support of the older organization, and watch with keen interest the progress of the Medical Association, whether or not it shall decide to affiliate with the existing bodies.

In the course of his remarks Mr. Rathbun referred to the National Museum at Washington as typical of the broadest scope of museum organization. Administered under the Smithsonian Institution, of which it was made a part by the Congressional Act of Establishment, passed in 1846, it covers the fields of both nature and art. The unfinished building in which this meeting is being held will be entirely given over to the collections of natural history, including geology and anthropology. The older building will be utilized for the arts and industries, and the Smithsonian Building for the fine arts and the library.

From the administrative point of view it has three functions — record, research and education. It is a museum of record in that it contains the material foundations of an enormous amount of scientific knowledge, mainly resulting from the work of national surveys, all Government collections being by law placed in its custody. It is a museum of research, which aims to make its contents serve in the highest degree as a stimulus to inquiry and a foundation for scientific investigation. It is an educational museum, through its policy of illustrating by specimens every kind of natural object and every manifestation of human thought and activity, of displaying descriptive labels adapted to the popular mind, and of distributing its publications and its named series of duplicates.

As one of the oldest museums in the country, it has been obliged to originate many methods bearing upon the administration, preservation and installation of collections, which have been widely copied, and, during the entire period of its existence, it has been in direct relations with practically all the museums of America, assisting by all the means in its power their development and improvement. It has been a member of the British Association from the beginning, and in the American Association it is expected to take an active part.

Prof. Sims Woodhead said that he had listened to what might be called two sides of an important question with profound interest. He thought that, whatever might be the decision now, the time would ultimately come when affiliation with the broader Associations of the museums of science and art would become not only desirable, but necessary. He felt, however, that at the present hour this Association should devote its whole energy to getting to work, and to elaborating a system of its own; that instead of diffusing its energy in studying the organization of the general Associations, it had sufficient to do in reaching and attaching the leading medical museums throughout the world, and in developing its system of interchange with these. In this way a very strong body might be formed. In England the many medical museums are all independent of each other. Fine as they are, the speaker considered they could have done a better work had they made their beginnings an Association of this kind. A common method of classifying might easily be arranged by a central committee and a regular system of exchange adopted. Methods of technique, which are liable to fall behind the times in some particular in any museum, will be modernized and brought up to date by comparison with what is being done elsewhere. His wish would be to see a quarterly Bulletin issued, containing expert contributions upon such subjects as the above.

A letter was read from Dr. W. J. Holland, Director of the Carnegie Museum, Pittsburgh, and President of the American Association of Museums, regretting the writer's inability to be present, and extending a cordial invitation to affiliation with his Association, which, he said, would watch with interest and sympathy the organization of the younger society.

Mr. Rathbun said that, after hearing Prof. Sims Woodhead's remarks, he felt, with him, that it might be wiser to defer affiliation for the present.

It was resolved: That affiliation with the American Association of Museums shall not be considered for the present.

DISCUSSION II.—*On the methods by which this Association may be made most useful to its members, by elaborating plans of exchange, issue of a Museum Bulletin*, etc., was opened by Professor Warthin. The speaker felt that the simplest way in which to illustrate the necessities of the case was to speak of his personal needs at the medical school at Ann Arbor, Michigan. This town, owing to its situation, far inland and somewhat isolated, furnishes a unique clinical material, rich in pernicious anaemia, leuchaemia, etc., but almost lacking, for instance, in typhoid. To him, an opportunity for the exchange of his often really rare material for specimens of very common occurrence elsewhere would be of great value. He felt also the need of the exchange of individual experience, and would welcome a Bulletin giving the opportunity for the exchange of ideas on methods of preservation, etc., and arranging for the interchange of material. He believed, too, that a uniform system of museum classification might be elaborated, which would help greatly towards that standardization of medical education which was the ideal of some of us, in which the practice followed in the German schools might be attained, the student passing in his "*Wanderjahre*" from one university to another during the completion of his medical course. In short, he felt that the organization of this Association filled an imperative want, in exposition of which enough could scarcely be said.

Prof. Sims Woodhead dwelt on the need of a medium of exchange. Different types of disease occur in different regions. In Edinburgh, for instance, he had seen much Addison's Disease, and amyloid degeneration was of daily occurrence, but both of these conditions are rare at Cambridge. It would be an easy matter and almost no extra expense to prepare duplicate specimens for exchange.

Professor Fibiger thought this Association of extraordinary importance, especially in foreign lands, where an interchange of specimens would become of the highest value. Thus Denmark was a healthy country, and, although there was a large autopsy material at Copenhagen, many of the commoner conditions were lacking entirely, while some conditions, rare elsewhere, were relatively not infrequent. In one year he had had 2 cases of ochronosis, 4 of female hermaphroditism, 1 of idiopathic dilation of the oesophagus without stricture of the cardia, 2 of solitary tubercle of the liver, and 2 of acquired pulmonary stenosis. He would gladly receive, on the other hand, specimens of cholera, diphtheria, dysentery or typhoid. Microscopic slides could be exchanged with especial ease. All specimens exchanged should be accompanied by accurate clinical information. Professor Fibiger ended by suggesting that requests for specimens, with lists of exchanges, should be circulated among the members forthwith.

Professor Wesbrook agreed that the Association should be asked to circulate at once two sets of lists, one of material wanted, the other of material available for exchange. He considered the need for this Association established, that further discussion upon this point was unnecessary, and that we should proceed at once to the establishment of a pathological clearing-house.

Professor Adami said that difficulty was likely to arise in the mechanism of the distribution of material, and inquired whether specimens for exchange should be sent to a central point, or whether the Bulletin should act as the medium. He suggested that a small subcommittee be formed to act in this matter.

Dr. Warthin believed that the only "pathological clearing-house" necessary was the Bulletin, and moved *that an editorial committee of five members, which shall include the President and Secretary, be appointed to publish a Bulletin, which shall act as a pathological clearing-house. Carried.*

DISCUSSION III.—*On the Feasibility of Establishing an Index Pathologicus,* was opened by Prof. W. G. MacCallum. The question under consideration was whether it would be practicable to form a central bureau of information, which might be consulted to ascertain where specimens of interest were to be found, both gross specimens and material for research. It was suggested that a collection of catalogues might be made at one or more central points: thus the file of catalogues at the Surgeon General's Library might be made more complete, each member contributing a copy of his catalogue even in cases where this was not to be had in printed form.

Dr. Warthin proposed that each member exchange catalogues with the others, each museum in the Association thus acquiring a file of its own.

Professor Wesbrook considered this an enormous business, and moved that *the matter be left to the discretion of the Executive Committee, with power to increase the assessment, if necessary. Carried.*

DISCUSSION IV.—*On the proposed Constitution of the International Association of Medical Museums.* Dr. MacCallum announced that several modifications, all in the direction of increased simplicity, had been made by the Executive Committee in the proposed Constitution as set forth in the circular letter which had been issued to prospective members. These changes were:

(a) All persons actively engaged in or interested in the work of a medical museum may become active members, on election, and the payment of $2 per annum.

(b) Only those persons officially accredited to a medical museum as its representative may vote.

(c) The meetings shall be held annually (instead of triennially) at the time and place decided upon by the Executive Committee.

The meeting adjourned.

PART II.

The meeting was called to order by Prof. W. G. MacCallum on Friday, October 2d, at 12 M.

There were present: Professor Harbitz, University of Kristiania, Norway; Prof. J. G. Adami; Dr. Lamb, of the Army Medical Museum; Dr. P. G. Woolley, Professor Souchon, Dr. Watters; Dr. Hirsch, of the University of Maryland; Mr. Izzard, of the New Medical Schools, Cambridge; Dr. Snow, of Stanford University, California; Dr. Cone, of Baltimore; Dr. Abbott, and others.

The Constitution, as revised by the Executive Committee, was presented. *Moved by Dr. Warthin, seconded by Dr. Woolley, that the Constitution be adopted in full. Carried.*

The following officers were elected:

President: Prof. W. G. MacCallum, Baltimore (elected on the preceding day).

First Vice President: Prof. G. Sims Woodhead, Cambridge, England.

Second Vice President: Prof. J. Ritchie, Edinburgh, Scotland.

Third Vice President: Prof. Ludwig Aschoff, Freiburg, Germany.

Councillors: Major F. F. Russell, Army Medical Museum, Washington, D. C.

Prof. A. S. Warthin, University of Michigan, Ann Arbor, Michigan.

Secretary-Treasurer: Dr. Maude E. Abbott, McGill University, Montreal.

The following were appointed an Editorial Board for the publication of a Medical Museum Bulletin:

The President and Secretary, *ex officio.*

Prof. J. Ludwig Aschoff.

Prof. J. G. Adami.
Prof. A. S. Warthin.
Major F. F. Russell.

The following new members were elected:

Prof. George Streeter, Anatomical Department, University of Michigan.
Dr. James Miller, University of Birmingham, England.
Dr. P. G. Woolley, University of Nebraska, Lincoln, Nebraska.
Dr. W. R. Stokes, College of Physicians and Surgeons, Baltimore.
Prof. W. McN. Miller, University of Missouri, Columbia.
Prof. Francis Harbitz, University of Kristiania, Norway.
Dr. J. R. Mohler, Veterinary Department, Bureau of Animal Industry, Washington D. C.
Mr. F. Izzard, New Medical Schools, Cambridge, England.
Mr. E. L. Judah, McGill University, Montreal.
Dr. Emanuel Libman, Mount Sinai Hospital, New York.
Dr. J. L. Hirsh, University of Maryland, Baltimore.
Dr. W. F. Snow, Stanford University, California.
Dr. M. J. Rosenau, U. S. Pub. Health and M. H. S., Washington, D. C.

The first item on the program was a paper by Dr. W. G. MacCallum *On the Preservation of the Results of Research as Material for Medical Museums.* The development of the museum idea was traced from the simple instinct of the child for collecting together the things that interest him, through the intelligent arrangement of such collected objects in ordered series, down to the time when the individual acquires certain specialized interests of his own, and collects material of value along these particular lines. The value of such an Association as this in developing the Medical Museum to the scientific level of this final stage of the collector may be very great. Of particular importance may be made the systematic preservation of the results of any given piece of research, so that it may remain as such in the museum. This is a practice usually carried out at the Johns Hopkins Hospital, and most material lends itself well to such graphic presentation. The tissues used in the experimental work of Dr. Walker were shown as illustrative of how such results of research might be shown.

On the Classification of Museum Specimens. In this paper Dr. Abbott put in a plea for the use of a modification of the Dewey decimal system of museum classification, which has been employed in the McGill Medical Museum for some nine years with ever-increasing satisfaction to all concerned. The advantage of the system is that it supplies a descriptive group number, so that individual specimens may be added at any time without disturbing the sequence of the consecutive numbers. In this descriptive number the figures representing the anatomical classification precede, those of the pathological classification follow the decimal point, while the individual specimen is indicated by a small index figure placed at the upper right-hand corner of the descriptive number. Thus 11.34^1. The anatomical classification followed is given in American Medicine of April 4th, 1902; the pathological classification as stated there is now being revised and will be republished in Vol. I of the McGill Catalogue.

Dr. Lamb said that long experience in museum work had taught him that simplicity was the thing to be chiefly aimed at in the cataloguing of specimens. In the use of a complicated system of numbers errors were liable to creep in.

Dr. Warthin objected that no pathological classification could be universally adopted, for all pathologists differ in certain of their theories of disease. It was difficult again to establish a thoroughly logical classification. Thus, in that used at the McGill Museum (now being circulated in the room) he noticed some overlapping and repetition.

Dr. Abbott replied that the overlapping was intentional. That certain pathological conditions were purposely classified in two places in order to give the cataloguer a certain degree of latitude in the use of the descriptive figures, in cases in which for some reason this might be necessary. The difficulty of determining upon a common pathological classification was undoubtedly serious, but she believed it might be done on sufficiently broad lines to meet with the approval of a central committee, as has been the case with the work of the London committee upon the nomenclature of disease. She agreed with Dr. Lamb that simplicity was essential in the work, but claimed that this system had been found in its workings at McGill to be perfectly simple and to give the key to a systematic arrangement of large masses of material. Minute subdivisions of series, the descriptive numbers running into a large number of decimals, is the snare which leads to confusion.

Dr. MacCallum said that the general trend of recent opinion seemed to be gradually increasing in favor of the Dewey system. The crux of the matter seemed to be the avoidance of minute subdivisions and the running into many decimal points in the descriptive numbers.

The paper by Profs. Arloing et Courmont, Lyon, France, *Demonstration des photographies en couleur des pieces et des coupes microscopiques,* was read by title in the absence of these gentlemen.

Professor Souchon described a *new method for the preservation of the permanent color of muscles, nerves and vessels, also of pathological specimens,* published in the *Journal of the American Medical Association,* August 22d, 1908. Some magnificent dissections, brought from New Orleans by the speaker, were shown. The process described was one of embalming, and stress was laid upon dissection in the natural position of the organ, and in preserving it in a jar sufficiently large not to disturb the relations. (Abstract follows.) Some discussion ensued, and Dr. MacCallum expressed the appreciation of the Association of Dr. Souchon's kindness in bringing these beautiful specimens so great a distance.

Dr. Watters gave a practical demonstration of the different steps in his method of *mounting museum specimens in gelatin,* with which he has had such brilliant results. An abstract of his paper (published in the *Medical Record,* December 22d, 1906) follows. This paper was discussed by Professors Adami, Souchon, MacCallum and others.

Dr. Adami presented a paper by Mr. E. L. Judah, *on methods of mounting moist specimens in square glass jars, on frames and under clock glass, etc.* Nothing original was claimed for these methods, but the finer practical points in their technique were discussed.

Mr. Izzard, Cambridge, England, claimed the attention of his audience in an interesting description of *a rapid method of macerating bone,* by which beautiful results are attained, the bone appearing dry white and coral like after a few hours subjection to a constant temperature of 85° F. (29.5°C) in stagnating water. The full article is published below. Dr. Souchon, Dr. Adami and others discussed this.

Prof. A. S. Warthin demonstrated a special square museum jar in which, by the use of a "dental dam" made of rubber and felt and a wooden clamp frame, the jar might be closed without the use of cement, to be reopened again at will.

Dr. Abbott demonstrated a series of specimens of *Anomalies of the Heart,* obtained from the Army Medical Museum and the Museums of the McGill University and the Johns Hopkins Hospital.

The meeting then adjourned to examine the exhibits of the Congress of Tuberculosis, and thence to the Army Medical Museum, where an interesting demonstration of specimens illustrating tropical diseases, with special reference to amoebic dysentery and infection by the treponemata, was given.

DEMONSTRATION OF THE GELATIN METHOD OF PRESERVING SPECIMENS.

By W. H. Watters, A. B., M. D.,

Professor of Pathology, Boston University, Boston, Mass.

The method demonstrated was identical with that described in the *Medical Record,* December 22d, 1906. The essential points in that article are, therefore, quoted here.

Preliminary Steps: These coincide accurately with the Kaiserling method. Care should be taken to secure the specimen to be mounted in as fresh a condition as possible, for the color once lost can never be regained. The best results are obtained when less than ten or fifteen minutes elapse between the time that the tissue is removed and its submersion in the fixing fluid. If several hours must intervene, dry cloths or cotton should completely envelop it to absorb the moisture. Refrigeration, while preserving the color temporarily, should not be employed on specimens to be thus prepared. All free blood adherent to the surfaces, due to the surgical or post-mortem operation, should be gently washed away, and the tissue placed in a relatively large amount of the following solution:

No. 1:	Potassium nitrate	15 grams.
	Potassium acetate	30 grams.
	Formalin	200 cubic centimeters.
	Water	1,000 cubic centimeters.

At this time care must be taken to have the various parts placed exactly as they are finally to remain, for within a short time they become fixed in whatever position they happen to be, and cannot be altered thereafter. If the specimen possesses a cavity, as does the gallbladder, appendix, intestine, etc., the contents may be carefully removed and replaced by some of the above solution. A very successful way to preserve the natural contour of the unopened gall-bladder is to introduce the fluid through the cystic duct with an injecting syringe, its subsequent escape being prevented by a ligature or an artery forceps. A large, firm organ, such as the liver, should be sectioned before immersion, in order to allow the solution to penetrate equally every part and give uniform results. In the case of the lungs, the trachea and bronchi may be utilized as channels through which the liquid may be forced to every minute part. Metals should not be used here, or at any other stage of the process, to force light tissues to sink. We have found that in these cases the specimens, if allowed to float after lightly wrapping in a considerable amount of gauze, will be satisfactorily preserved. The length of time essential for complete fixation of color varies with the size and variety of specimen. About twelve hours will usually prove sufficient for the majority. Brains, blood clots, and very large specimens require from one to two days. At the end of this time the object, which should now be comparatively firm, is removed from the liquid, immersed for a few minutes in water and then placed in

No. 2: Alcohol.

From the color standpoint, this is the most important part of the entire process, as the return of the color temporarily lost in No. 1 solution will be partial or complete, according as the alcohol is applied for an improper or a proper length of time. And the only way to determine that proper time is to watch each individual case. When the tissue is removed from the fixative fluid, the blood is of a dark-brown color. Upon submersion in alcohol this is gradually replaced by a light-red one, essentially the same as normal blood. As soon as this tint is seen the alcohol may be known to have acted sufficiently long, and should be removed at once. From one to five hours will probably be a fair average for the majority of preparations. Prolonged immersion will cause the color to fade, after which it cannot be regained. Others have recommended two alcohols of varying strength, but if the amount of fluid in proportion to the size of the specimen be large, a single solution will give practically as good results. Occasionally the selected surface will not look very fresh, even after the use of alcohol, probably on account of overfixation. This may often be remedied by cutting a thin slice from the edge, thus exposing an area on which the fluids have not acted so intensely. In fact, it is our custom, in preparing kidneys, livers and similar specimens, to preserve intact that part through which the section is to be made until after the alcohol has acted for a few minutes. By this means a freshness is secured that is not otherwise attainable.

The colors having now returned, whatever excess of alcohol is present is washed away by water, or the specimen may be placed without washing into

No. 3:	Potassium acetate	100 grams.
	Glycerin	200 cubic centimeters.
	Water	1,000 cubic centimeters.

Here it may remain for days or months as a permanent mount (Kaiserling), or it may be continued to the final step.

The Final Step: Mounting in Gelatin: The sooner this step is taken the better will be the preservation, as Kaiserling No. 3 tends to macerate tissues. Some of our best specimens have been subjected to this solution (No. 3) for less than one hour.

No. 4:	Gelatin	200 grams.
	Kaiserling's Solution No. 3	3,000 cubic centimeters.

About three or four litres are placed in a good agate-ware pail, which is placed directly over a gas stove, the entire solution being brought to the boiling point in the shortest possible time. Care must be taken to prevent burning, although the danger is not great. When a temperature of about 55° C. has been reached, and the gelatin is nearly all melted, the white of one egg is added for every liter present, and the entire solution is rendered strongly acid by acetic acid. The coagulated white of egg helps to clarify, as does also the acetic acid. In addition, the acid probably renders the medium a better color conserver. As soon as boiling becomes active, the hot preparation is poured into a filter with two thicknesses of paper, and the clear solution is collected in the stock jar. When ribbed funnels are used no difficulty is experienced in the process, but with the smooth ones more rapid results are attained by placing the whole apparatus into a large steam sterilizer, where the gelatin will not solidify. After solidification, a crystal of thymol placed on the top of the stock solution will effectually prevent the appearance of fungi.

In a container holding about two liters there should be but little more color to the solution than there is to pure water. In smaller amounts there should be practically no color at all. Having now prepared our medium, we will proceed to the permanent mounting. This may be performed in square museum jars, round jars, test tubes, etc., according to the nature of the specimen, but will be probably more attractive and useful if made in a Petri dish, as described in our article of 1902, to which reference has already been made. The thymol is now removed from the stock solution of gelatin and the bottle is placed in a steam sterilizer for liquefaction. When completely liquid, and at a temperature of aout 45° or 50° C., a thin layer is poured into a Petri dish, and to it is added about one drop of formalin to each 20 c.c. of the solution. Into this is placed the specimen, face downwards, where it is allowed to stay till the gelatin has become solid. More of the formalin-gelatin solution is now added, sufficient to almost, but not quite, fill the dish. This should be allowed to solidify thoroughly for ten or twelve hours in the ordinary room temperature. More of the same preparation is finally added, till a slight convexity is formed above the edge. A wet plate glass is now quickly placed on the liquid gelatin in such a way as to force out all the air bubbles and rest evenly upon the upper edge of the dish. This may be performed in one of two ways. The plate may be allowed to touch first one side of the dish and then gently lowered in such a manner as to form a wave of gelatin that will drive out all bubbles. Or it may be pushed on from one side, the plate and dish being parallel, if an excess of the solution be maintained in front of the advancing edge. This being completed, it is set aside for an hour or more, with the plate still on top. The superfluous gelatin is now gently removed with a coarse brush, and a cement of Canada balsam, with 20 per cent. clove oil, is applied around the entire circumference. The next day the glass is carefully washed, another coat of balsam is applied, and the specimen is permanently mounted.

Petri dish-mounting is more complicated and requires much more practice than do the jar mounts, but, as stated above, is much more attractive.

Great care must be taken in using the formalin. Too much will cause undue contraction of the gelatin and appearance of air bubbles; too little will allow liquefaction with its resultant disadvantages. Just enough will (and has) preserved the specimen in practically perfect condition for years. Another point to be noted is the complete solidification of the full dish of gelatin before applying the cover. This allows of about all the contraction that will naturally occur, thus tending to prevent the entrance of air bubbles. The Petri dishes are the same as ordinarily used in bacteriological work, and may be obtained in various dimensions. With the smaller ones common window glass may be used as bases, but for the larger ones plate glass will be preferable. Canada balsam, even with the addition of clove oil, is not a perfect sealing agent; it is, however, so much more pleasing in appearance than the various gutta percha compounds that it is preferred. A fresh, thin coat, quickly applied with a camel's-hair brush every six to twelve months, will usually be successful.

Much simpler than the above is the mounting of specimens in jars and large test tubes. Here all that is required is to fill the container with a sufficient amount of formalin-gelatin, place therein the specimen, allow to solidify, and put on the top. In the majority of these cases a small air space is left at the top of the jar. Various parts of plants have been mounted in this No. 4 solution after fixation in a single formalin solution, with good results. The same statement will apply to preservation of flies, leeches, fish, snails, cockroaches, and many of the other lower forms of life.

The advantages claimed for this method after a trial of six years are:

1. The permanency of the mounts, which stood with practically no detriment, return journeys for exhibition purposes from Saratoga, N. Y.; Cleveland, Ohio; St. Louis, Mo.; Portland, Ore.; Washington, D. C.

2. The compactness and neatness of the specimens.

3. The easy adaptability for class demonstration and for use with the reflectoscope.

4. The successful preservation of colors through six used years of constant exposure to light.

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RAPID METHOD OF MACERATING BONES.

By F. A. Izzard,

New Medical Schools, Cambridge University, England.

The preparation to be macerated, say, for instance, a wrist joint, fresh from the operating theater, should be prepared as follows:

Take the preparation and make several superficial incisions about it, taking care that the incisions are only a little deeper than the skin, because, should the specimen be a periosteal sarcoma, or anything of a delicate nature, the knife, cutting too deep, may distort, or even spoil, the whole effect of the beautiful coral appearance which can be obtained by this method. Having prepared the specimen thus far, you should then proceed to put it into a pan containing water (rain water preferred), which should be at 85° Fahrenheit, and kept at that, until the specimen has finished macerating. It is necessary to change the fluid about every four days, or otherwise the fluid becomes stagnant and hinders the process of rapid maceration, besides allowing the fat to solidify inside the bones, which would cause a deal of trouble.

The fluid should be changed every four days until the bones can be seen to be perfectly free from any soft material. The bones can then be taken from the pan and scalded with two or three kettles of boiling water, which will clean off all the excess of filth from the bones, and the biggest portion of the fat will also come from them. You then get another supply of boiling water and scrub the bones with a plentiful supply of soap, using a tooth brush, as the ordinary nail brush is much too coarse. Having done that, you scald the bones again with another kettle of water to clear them of any sediment of soap or maceration material which may still hang about them. You then put the bones to drain and dry in the sun or by a fire. When they are perfectly dry you should then examine them to see if there are any signs of grease left in them. If this method is strictly adhered to, as a rule, they are perfectly free; but should any signs of grease be detected, they should be put into "benzolin" for two or three days, when the grease will soon leave them.

When the bones are taken from the benzolin they should be drained and scrubbed again with hot water and soap and dried as before. They will, as a rule, dry a very good color, but to get them particularly white they should be put into a 10 per cent. solution of peroxide of hydrogen (distilled water being used) for several days. They will take no harm if they are left in longer. You then take them from the bleaching solution and drain and dry as before. The bleaching solution can be used for several specimens before becoming stagnant and useless. Any use of the knife should be abandoned after you have made your first incision. The main points of this method are: *that you should keep the proper temperature throughout*, as it can clearly be seen that the secret of this method is *"maceration by bacteria."*

It would be well to mention that before putting bones into benzolin a couple of small holes might be made to allow the benzolin to enter more quickly. Another point worth mentioning is, to put two plates on the bottom of the macerating pan while the maceration is proceeding, as the bones sometimes tend to get stained through lying on the tin. The plates will also aid in regulating the heat. They should be put in the pan upside down.

Department of Exchanges.

One of the chief functions of this Association is to facilitate among its members the interchange of Museum Specimens, or of material for research. Work in this Department was initiated by the following circular letter sent out by the Secretary:

THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.
(Circular letter to members.)
October 29th, 1908.

DEAR DOCTOR:

Would you kindly inform me, if possible by return mail, of any needs which you may have for pathological material, either of the nature of specimens to supply lacunæ in your museum collection or of material for research work. Will you further inform me of any duplicate material you may have which would be available to other members for purposes of exchange. An immediate reply is desired in order that your requests or offers of exchange may be announced to the other members of this Association through the columns of the next issue of the Bulletin.

May we ask you, as a member of this Association, to reserve a shelf or other place where all duplicate material which you consider of value and useful for exchange may be stored from autopsies, and thus enable you to respond to requests from other members of the Association when these come in from them.

The response to this letter has been most gratifying. While many announce themselves unable to send in lists at the present moment, all cordially support the movement and promise information later, while statements of material wanted, or of duplicates for exchange, have been received from a number of members, and these are given below. Suggestions thrown out in some letters have been met by counter-suggestions in others. Thus Professor Leith, of Birmingham, England, writes:

"I called a meeting of my Assistant Curators of the Pathological Museum here, and of the Pathologists of the General and Queens Hospitals, and general approval was expressed of the objects of the Association. We felt inclined to await the appearance of the Bulletin in order to have some guide as to the limits to be placed upon exchange specimens. It was generally thought that only rarer specimens need be quoted both for giving and receiving."

Professor Wesbrook, of the University of Minnesota, writes: "It seems to me that in your first efforts you will find people better able to say what they do not have than what they have in abundance, and after the first Bulletin or two those who have material showing what appear to them common conditions, such as might come to everyone, will see that there are certain other members to whom such materials would be useful, and we shall then be able to list our material available."

The following conditions of the Exchange are proposed:

It is understood that the cost of transport shall in all cases be paid by the institution receiving the material requested.

It is further suggested: (1) That the exchange shall be transacted directly between the giver and recipient, and that the giver shall first notify the applicant of his intention of sending it, in case the request has been already granted by some other member of the Association. (2) That, unless the specimens are very small, they shall be transported, not in individual glass jars, but in bulk, wrapped in moist wool or cheesecloth, and packed in soldered tin or other water-tight receptacle. (3) That each specimen shall be tagged with its number. (4) That not merely the nature of the specimen, but, where possible, a brief history of the case, shall be forwarded to the recipient.

It is begged that each recipient will notify the Secretary as soon as his request has been granted, in order to avoid a repetition of the request in the next issue of the Bulletin.

If the material offered in exchange by the recipient of a given specimen is not such as is needed by the donor, the latter is requested to communicate his need to the Secretary, who will make a special effort to obtain, through correspondence as well as through the columns of the Bulletin, his particular need.

The following exchanges have been proposed. They are arranged in the alphabetical order of the institutions represented:

MATERIAL DESIRED.

1. Any specimens illustrating the rarer forms of disease, the rarer forms of monstrosity, and of human parasites.

Requested by: Major F. F. Russell, Curator, Army Medical Museum, Washington, D. C., U.S.A.

2. Specimens of hearts from cases of scarlet fever showing endo-, peri- and myo-carditis.

Requested by: Prof. J. Walker Hall, Pathological Department, University College, Bristol, England.

3. Specimens of plague, preserved by the method of Kaiserling.

Requested by: Professor Fibiger, University of Copenhagen, Copenhagen, Denmark.

4. Any material, both specimens for use in the museum or smaller sections for purposes of scientific research, both the larger parasites and micro-organisms, from those parasitic diseases which do not exist in Central Europe, and particularly the following:

Bilharzia (parasites and diseased organs).
Sleeping Sickness (parasites and diseased organs).
Filariasis (parasites and diseased organs).

Requested by: Prof. M. Askanazy, University of Geneva, Geneva, Switzerland.

5. Information of cases of diseases of the para-thyroid, tetany and acromegaly, and, if possible, the tissues from these cases.

Requested by: Prof. W. G. MacCallum, the Johns Hopkins Hospital, Baltimore, Md.

6. Syncytioma, fatty degeneration of the heart, fibroid heart, hæmorrhagic pancreatitis, chronic pancreatitis, intestines in typhoid, verrucose endocarditis.

Requested by: Prof. Henry Albert, University of Iowa, Iowa City, Iowa.

7. Specimen of amœbic dysentery, blastomycosis.

Requested by: Prof. Francis Harbitz, University of Kristiania, Kristiania, Norway.

8. Specimens of fatty degeneration of the heart (colors preserved), multilocular echinococcus cyst of the liver, and other unusual forms of human parasites, tropical disease.

Requested by: Prof. J. G. Adami, McGill University, Montreal, Canada.

9. Anomalies of the heart and blood vessels.

Requested by: Dr. M. E. Abbott, McGill University, Montreal, Canada.

10. Specimens of typhoid fever.

Requested by: Prof. A. S. Warthin, University of Michigan, Ann Arbor, Mich., U.S.A.

11. Tissues from the acute infections, as diphtheria, smallpox, scarlet fever, blastomycosis, all tropical diseases as amœbic dysentery, cholera, yellow fever, malaria, intestinal, skin and other parasites.

Requested by: Prof. F. F. Wesbrook, University of Minnesota, Minneapolis, Minn., U.S.A.

DUPLICATE MATERIAL AVAILABLE AND OFFERED IN EXCHANGE.

1. Abscess of cerebrum and cerebellum, the latter from disease of ear; cerebral meningocele.

Rupture of right auricle of heart, cause unknown; open foramen ovale in man age 61, no symptoms; old adhesive pericarditis.

Typhoid and dysenteric ulceration of intestines.

Abscess of liver, probably amebic.

Angioma of liver.

Congenital cysts of kidney.

Tuberculous meningitis of brain, and tuberculosis of lung, intestine, mesentery, spleen, kidney and skin.

Swine plague, lung and intestine.

Leprosy, amebic dysentery, yellow fever.

Necator Americanus.

Offered by: Major F. F. Russell, Curator, Army Medical Museum, Washington, D. C., United States.

2. Anæmic necrosis of the liver.

Offered by: Prof. J. Walker Hall, Bristol, England.

3. Different forms of tumors of the thyroid gland, including malignant disease; specimens of nodular (gross knotige) tuberculosis, especially of the spleen and liver; amyloid degeneration of organs, typhus abdominalis, bacillary dysentery, general melanomatosis, leuchæmia.

Offered by: Prof. Ludwig Aschoff, University of Freiburg, Freiburg i. B., Germany.

4. Specimens of amœbic dysentery, typhoid fever, regenerative changes in the liver, Hodgkin's disease.

Offered by: Prof. W. G. MacCallum, Johns Hopkins Hospital, Baltimore, Md.

5. Parasites, such as Distomum felin in man, larvæ of Dibothriocephalus latus, goitres, senile osteomalacia, and other diseases peculiar to Switzerland.

Offered by: Professor Askanazy, Geneva, Switzerland.

6. Hydatid mole, fibroma of the uterus (several specimens), cystoma of ovary (several specimens), carcinoma of colon, primary contracted kidney, suppurative salpingitis.

Offered by: Prof. Henry Albert, Iowa City, Iowa.

7. Specimens of the central nervous system in acute poliomyelitis. The cases are described by Professor Harbitz and Dr. Scheele, Path. Anat., Untersuchungen über akute Poliomyelitis und verwandte Krankheiten von den Epidemieen in Norwegen, 1903–1906. Kristiania, Norway, Jakob Dybwad, 1907.

Offered by: Professor Harbitz, Kristiania, Norway.

8. Pernicious anæmia, leuchæmia.

Offered by: Prof. A. S. Warthin, University of Michigan,
Ann Arbor, Michigan.

9. Typhoid fever, tuberculosis, pneumonia, tumors (in large numbers), leuchæmia, pernicious anæmia, osteo-myelitis.

Offered by: Prof. F. F. Wesbrook, Minneapolis, Minn.

Officers and Honorary and Active Members

OF THE

INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

MAJOR JAMES CARROLL, Curator, Army Medical Museum, Washington, D. C., Chairman of the Organizing Committee and first President of this Association.

Born, June, 1854.

Died, August, 1907.

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19. Pathological Institute of the University of Geneva, Geneva, Switzerland; Prof. M. Askanazy.*
20. University of Glasgow (Pathological Museum of the Western Infirmary), Glasgow, Scotland; Prof. Robert Muir.*
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30. Museum of the Mater Misericordiae Hospital, Dublin, Ireland; Prof. E. J. McWeeney.*
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54. University College, Bristol, England; Prof. J. Walker Hall.*
55. University of Vienna, Pathological-anatomical Museum, Vienna, Austria; Prof. Anton Weichselbaum.*
56. Women's Medical College, Baltimore, Md., U. S. A.; Dr. Claribel Cone, 1701 Eutaw Place.*
57. Western Reserve University, Cleveland, Ohio; Prof. Wm. T. Howard, Jr.*
58. Royal Victoria Hospital, Pathological Laboratory, Montreal, Canada; Dr. Oskar Klotz.

Constitution and By-Laws

OF THE

International Association of Medical Museums

CONSTITUTION.

ARTICLE I.—*Name and Objects.*

This Association shall be called: The International Association of Medical Museums. It shall have as its objects:

(a) The promotion in a general way of the efficiency of the Medical Museum as a compendium of scientific facts, a storehouse of material for, and of the results of, research, and as a medium for teaching.

(b) Discussion of plans of cataloguing and classification, and methods for the preparation and preservation of specimens.

(c) Arrangements for the interchange of specimens and for the specialization of certain museums along particular lines in which they may enjoy the best facilities.

(d) The publication of a Medical Museum Bulletin, which shall aim at the furtherance of the above objects.

(e) The consideration of the feasibility of establishing an Index Pathologicus in the future.

ARTICLE II.—*Membership.*

The membership shall be elective, and shall be international in scope, including representatives of the leading medical museums throughout the world.

All persons actively engaged in, or interested in, the work of medical museums may become active members on election and the payment of $2 per annum.

Only those persons officially accredited to a medical museum as its representative may vote.

Persons distinguished for eminent services to science, and especially to the cause of museums and of this Association, may be made honorary members.

ARTICLE III.—*Fees.*

There shall be an admission fee of $2, payable by active members immediately on their election, and an annual fee of $2, payable in May of each year, and falling due the year after election.

ARTICLE IV.—*Officers.*

The officers shall be a President, three Vice Presidents, a Secretary-Treasurer, and two Councillors, all of whom shall be elected annually at the regular meetings of the Association. These officers shall together constitute an Executive Committee.

ARTICLE V.—*Meetings.*

Meetings shall be held annually at the place and time decided upon by the Executive Committee.

ARTICLE VI.—*Transaction of Business.*

All matters of general policy and interest shall be decided by a two-thirds majority vote of all the voting representatives present at a stated meeting. At such meetings nine members shall constitute a quorum.

The vote may be taken in the interim of the meetings by the Secretary by means of correspondence, and the matter submitted shall then be decided by the two-thirds majority vote of all the voting representatives.

Together with each stated meeting there shall be a session of the Executive Committee for the transaction of business. At such meetings four members shall constitute a quorum.

ARTICLE VII.—*Changes in the Constitution.*

Amendments to the Constitution shall be decided by the two-thirds majority vote of the active members. Such measures shall be proposed in writing to the Secretary, who shall submit them to the Executive Committee, and through these to the Association, either at the regular meeting or in the interim by means of correspondence.

BY-LAWS.

I.—*Duties of Officers.*

The President, Vice Presidents and Secretary-Treasurer shall discharge the duties usually assigned to these offices. The Secretary-Treasurer shall, in addition to these duties, call for and receive the written votes of all the voting representatives in all matters to be decided by correspondence in the interim between the regular meetings, and shall secure papers and addresses for the regular meetings and arrange the program therefor.

II.—*The Editorial Committee.*

A Committee on Publication, including the President and Secretary, *ex officio,* and three or more other members, shall be appointed every three years, who shall have as their duty the periodical publication of a Museum Bulletin.

III.—*Changes in By-Laws.*

A By-law may be amended by the two-thirds majority vote of the voting representatives, one month after the written notice of the proposed amendment has been received by them.

THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

Editorials.

ON THE ESTABLISHMENT OF AN EUROPEAN SECTION.

That the establishment of an International Medical Museum Association has not been a barren effort but is bearing good fruit the present number of this Bulletin testifies. The opportunity now afforded in this, the official organ of the Association, for the discussion of Museum methods, and the response thereto by workers in various countries, are in themselves a justification for calling the Association into existence. To our knowledge the pages of no other journal are open to a like series of reports, such as that here afforded upon the various methods of mounting museum specimens in their natural colors. But while services of this order justify its existence it may well be asked whether the Association may not be of further use to its members. Is it, for example, possible for the Association to become a clearing house for museum specimens and pathological material in general?

Just as certain libraries have become famous for collections of works bearing upon particular branches of knowledge so certain museums have already gained a reputation for the extent and development of their collections illustrating particular morbid states. We know how painful it is to part with a rare specimen; nevertheless, we cannot but admit that it must often happen that, isolated, such may be of very little utility, whereas forming a unit in an important series it may be of high value. Thus it may be positively immoral to retain a specimen in one's own museum and not place it where it will be of maximal service. Specimens under this category may be well and profitably exchanged between museums, each obtaining that which materially adds to the value of its own collections. So, again, much pathological material goes to waste year by year in our various medical centers, owing to the absence from those centers of those specially interested in one or other morbid condition,—material of the greatest value were it in the hands of workers elsewhere. It may well be suggested that the same agency which undertakes the one service might be employed for the other.

Nevertheless, the establishment of such an Exchange or clearing house is not a simple matter. It demands, in the first place, that the list of needs of the different museums and workers be published in a separate form, so that it may be "posted" or exposed in some position where it recalls continually its existence. "Out of sight is out of mind." It demands also the establishment of separate "clearing houses" in each country, with periodic expedition of collected material to the clearing houses of other countries. Obviously this Association through its present staff cannot undertake the whole duty of conducting this exchange of material. It can publish periodically lists of needs. Its small income alone prevents it from undertaking the actual interchange. Possibly, with the publication of the list of needs, individual workers and heads of institutions might correspond and forward material direct. This, however, means considerable expense to be borne by separate institutions and individuals possessing too often but little available capital. The ideal is that work of this nature should be undertaken by government institutions, after the excellent method inaugurated by the Smithsonian Institution at Washington for the distribution of scientific literature.

If the interchange is to develop it is necessary that, whether with government help or through the intermediation of some leading and public spirited institution, there should in each country be a national "clearing house" which should arrange exchanges between local museums and workers, and undertake, further, the correspondence and interchanges with the "clearing houses" of other countries. We are rejoiced to learn that Germany is already taking steps in this direction. There the Senkenbergisches Institute at Frankfort, under the direction of Professor B. Fischer, offers to become the clearing house for Germany. In Great Britain the Association of Pathologists and Bacteriologists has within the last few months initiated a more restricted movement seeking to aid the interchange of material between those engaged in research, and publishing a periodical list of needs very similar to that given out by this Association last year. Without pretending that the time is ripe for developing to the fullest the methods of International Exchange, we hail these signs of museum and research coöperation, and believe that the Association may well use its influence in supporting every movement leading towards these ends.

J. George Adami.

THE EXPERIENCE CIRCULAR.

The results of the first Experience Circular are very encouraging, and the replies received must certainly prove interesting reading for all workers connected with pathological museums. Leaving the "individual equation" out of consideration, the experience of the sixteen museums represented in the answers shows a decided degree of uniformity. With very careful work good results can be obtained with certain organs and tissues, and such specimens may last a number of years; but there is a gradual loss of color, which is hastened by exposure to light, heat and air. The answers, I think, all show that an ideal method has not yet been obtained, and that improvements in the technique of macroscopic preparations are greatly to be desired. This field has been but little worked compared to that of microscopic technique. If this Association can stimulate research in this direction it will be achieving something really worth while, and will have justified its existence. The sixteen answers given in this bulletin form a good foundation upon which to formulate a definite expression of opinion, which will be given in a later bulletin. It is hoped that other members of the Association will contribute something to this discussion, if in their experience they have worked out anything not touched upon in any of these answers. A contribution of personal experience from each member will be of value in the summing up of the question. The ânswers given here may be taken as a basis for discussion, and it will be gratifying if members who have not yet sent in statements of their experience in this line of work will do so now, that they may be used in a final summing up of the question.

Aldred Scott Warthin.

ON THE VALUE OF PUBLIC MEDICAL MUSEUMS, AND ON THE POSSIBILITY OF ESTABLISHING SUCH A MUSEUM IN EACH OF THE LARGER CITIES.

This Association may be of value from several points of view, such as introducing improved technique, methods of classification, etc. Perhaps its most important function is to stir up interest in the Museum, which is to be regarded *par excellence* as a method of instruction. The medical museum is, of course, particularly useful to the medical school, and museum specimens are extensively used for special demonstrations to students. But in the last two years the public uprising against tuberculosis and cancer has led to the establishment of instructive public museums and even itinerant museums, illustrating the various stages in these diseases. The wide interest shown in these exhibitions by the public is evidence that a popular demand exists. For many reasons it would be of great advantage to instruct the general public in these concrete ways. Not only may public interest be greatly encouraged in the direction of prevention of disease, but the popular fallacies as to the possibility of cure by patent medicines, Christian Science, etc., will be exposed, and a judicious exhibition arranged for the public eye of the results of some of the more important experimental investigations might be of great help in controverting the propaganda of anti-vivisectionists. The establishment on a large scale of such public medical museums would lead to an advance of general sanitation, to a suspicion of patent medicines, more broad-minded appreciation of the needs of autopsies and of the need for animal experimentation, for these results could be seen in their true value.

The public medical museum should have a special arrangement which would differ somewhat from the ordinary medical museum. In order to benefit the public the specimens of a given disease would have to be worked out in various stages along its whole course, and each specimen must be accompanied with a didactic label giving information about the portals of disease, mode of entrance and source of infection. Only those diseases need be represented which concern the life and family of most persons, such as pneumonia, typhoid, tuberculosis, cancer, etc. The contents should be arranged in such a form as to constitute a good traveling museum, which can be used for the floating population of a large city or as an itinerant exhibit in smaller centers.

For such a purpose money could easily be raised. In university centers the public medical museum could be begun under university auspices, municipal support and coöperation being obtained. Steps should be taken to accomplish this important end in each of the larger cities by those individual members of the Association who hold university posts giving them the necessary municipal and educational influence.

W. G. MacCallum.

Original Articles.

ON THE TEACHING OF PATHOLOGY BY THE CASE SYSTEM, SUPPLEMENTED BY GROSS AND MICROSCOPIC SPECIMENS.

By Thomas Ordway, M. D.,

Bender Hygienic Laboratory, Albany, N. Y.

The chief value of the modern methods of laboratory instruction lies in the fact that the student takes the initiative and active rather than the receptive and passive attitude. He may be an "investigator" almost from the start; this is well shown in the so-called Agassiz method of laboratory instruction.

The didactic lecture is largely used, owing to the possibility of orderly presentation of the subject in a limited time to a large number of students, the opportunity for the lecturer to offer personal experiences, for elucidating obscure phases of the subject, and for its directive value.[1], [2], [3]. "Education is something more than barnacle-like accretion of facts; if that were all, the mind is as likely to be burdened and hindered by them as furnished and helped."[4] The student takes little or no active part, is very apt to learn the subject matter in parrot-like fashion, and more often recalls later merely the mannerisms of the lecturer than to be influenced by the stimulus of his personality. The exposition of the general subject matter is likely to be better in a carefully selected modern text-book. A well arranged synopsis indicating the general scope of the subject and giving the relative parts due emphasis may be used, thus acting as a directive for supplementary reading and at the same time, with blank space and index[5], providing a reference storehouse for such actively acquired knowledge.

Cannon was, I believe, the first to point out the advantage of the case system in the teaching of medicine. He showed the importance of the active attitude of the student, concrete illustration instead of the abstract of the text-books. In referring to the case system as used in the Harvard Law School he says, "The newer method has aroused an ardor and a keenness of interest among the students such as was never known before. They learn their law, not by dreary grubbing at the text-books or lecture notes, but by vigorously 'threshing out a case with one another.'" [2], [3].

The case system is particularly adapted to teaching the clinical branches of medicine, and the experiences of the past ten years have fully justified Dr. Cannon's claims. At the Harvard Medical School the usual clinical work is successfully supplemented by case teaching in neurology, pediatrics, internal medicine[9] and surgery. Dr. Sampson of Albany has applied the same principle to the teaching of gynecology in the form of illustrated problems, with demonstrations by special mechanical charts, models and gross sections.[6], [7].

Although the clinical branches offer greater opportunity for case teaching in the discussion of history, symptoms, signs, diagnosis, prognosis and treatment, yet a similar method of instruction may be used with advantage to supplement and unify some of the so-called laboratory subjects, and particularly to fit the student for his clinical work in having him thus actually see the interrelation between and the entity of laboratory and clinical interests.

Almost ten years ago Dr. Magrath of Boston used to read descriptive autopsy protocols to the small groups of students in his quiz classes, having them vie with one another in deciding the anatomical diagnosis. While assistant to Dr. Councilman at the Harvard Medical School, fresh from two years internship in clinical work at the Boston City Hospital, I frequently discussed with him the value of case teaching in pathology and urged the addition of this method of instruction to the other teaching. Dr. Councilman and Dr. Rhea have collected a series of autopsy protocols covering a wide range of subjects, providing mimeograph copies for the students.

Instead of discussing merely the bare autopsy protocols, which should be entirely descriptive, that the students may fill in the accurate diagnoses, I have added very brief clinical data to make the case idea more tangible, and have had the students actually handle in their study pathological specimens, fresh when available, otherwise from the museum, and also microscopic preparations of these gross lesions, to make the diagnosis more exact and add completeness to the case. In teaching by this method I have found it possible, when necessary, to " construct " excellent typical and atypical " cases " as well as to emphasize important complications and closely allied conditions by specimens from the departmental museum.

The importance of large general museums with orderly arrangement and " natural " exposition of specimens as educational factors is widely recognized in general biology, art and history. Although the value of such collections illustrating medical subjects is restricted to a comparatively small number, one cannot visit such a museum as the Royal College of Surgeons in London without recognizing its unusual advantages for the study of normal and diseased specimens from widely varied forms of animal life. This presentation of the specimens in the so-called " physiological series " and " pathological series " is most interesting from a biological and medical standpoint; the admirable organization and arrangement add to its practical worth.

Most of the large medical museums, though utilized to some extent for demonstration to groups of students, remind one of " tours " of the unfortunate " parties " hurried through the famous museums by the commercial agent. The type of museum instruction in which the specimens are kept in glass jars (usually behind glass cases) has very little value, I believe, in practical teaching.

At McGill University the pathological museum, owing to the interest and enthusiasm of the Director and Curator, fills an important place in the teaching of pathology. In the words of Dr. Abbott, " it has already become a self-teaching mechanism, the possibilities of which as a supplement to both clinical and postmortem work are almost unlimited."[8] Although very desirable it may for one reason or another be impossible for the pathological departments of many medical schools to avail themselves of such collections. Most of them, however, have a smaller or larger so-called " working " museum at the school or hospital, and it is such that I propose to discuss.

In these cases the " housing," arrangement and classification of the specimens, which is necessary for effective use, is usually a problem. I have found the cheapest and most useful method for such a working collection to be a slight modification of that in use by Dr. Mallory at the Boston City Hospital with the autopsy and surgical material. To distinguish the gross specimens from the surgical and autopsy series which are designated respectively by the letters " S " and "A", each gross specimen is given the letter " K," the year, and serial number. Each year the numbers begin anew, that is, specimens received in 1909 are designated K-09-1, K-09-2, and so forth; those received in 1910 are labeled K-10-1, K-10-2, and so forth.

Most of the specimens are preserved by the Kaiserling method. Each is put into a separate container of suitable size. It is surprising how many of the smaller or sections of the larger specimens may be kept in the ordinary " lightning " half-pint and pint preserve jars. For others the usual round " Whitehall-Tatum " museum jar or the rectangular jars imported by Leitz are used. Only a limited number of the larger specimens, such as peritoneal, pelvic and thoracic contents, entire lungs, livers, hearts and so forth are retained.

As received, each specimen is labeled with a small piece of heavy butcher's linen, which has been previously marked in carbon ink (Higgins') and soaked in melted paraffin in the oven. The gummed label on the container is similarly marked and painted with white shellac. Nothing except the serial number is shown on the specimen or container, no indication whatever of the source of the specimen or the diagnosis. A serial catalogue gives a brief account of the specimen with cross reference to the surgical, autopsy or bacteriological series; in these more detailed data are found and reference to the clinical record. Besides this serial catalogue, which is in general chronological, the specimens are classified on an anatomical and pathological basis, the latter as far as possible etiological. A similar method is employed in classifying the microscopic slides from surgical, autopsy, and interesting bacteriological material, also lantern slides and reflectoscope illustrations.

Owing to this common system of classification and cross reference it is simple to arrange a demonstration showing the different processes in a single organ or the diverse results of a common injurious agent by the several teaching methods. The objections to this simple serial system are that it is not logical, and for the purposes of museum exhibition the collection is unsightly. The advantages, I believe, more than offset these objections; they include simplicity; the house officer or assistant taking charge of the surgical specimen routine receives and labels these gross specimens and files them in numerical order. With many specimens additional fragments are preserved for the purpose of diagnosis by microscopic section; this will be referred to later.

Flexibility is another advantage and is particularly necessary where there is but small space for museum and storage purposes. Cheapness is an important factor, for in few pathological departments is it possible to obtain the services of an efficient curator, assistant and special technician for this work. In this working departmental collection the stenographer who keeps the records may easily take charge of the cataloguing, as the system is the same as that of the autopsy and surgical series. A good laboratory "Diener" can see that specimens desired are taken to the class rooms for the section teaching and returned to their easily-found numerical places.

For case teaching in pathology the students are divided into sections of not more than ten men. At the Albany Medical School three mornings a week throughout the second year are devoted to pathology and bacteriology. In the last half of this year the study of theory and practice is taken up, and it is at this time that the presentation of pathology by a series of cases is particularly helpful. The method of conducting these quiz sections involves active discussion of provisional and absolute diagnoses, the causes, associated conditions or complications and the effects of disease. Each man endeavors to maintain his diagnosis, and to do this must learn the simple technique of frozen and celloidin section to prove or disprove his opinion. The general method is indicated by the following illustrative cases.

CASE I. *Malignant Leiomyoma of the Uterus.*—For illustrating manner of diagnosis and methods of acquiring histological technique. Woman, 38; married; 3 children. For some months weak, pale, slight cough, loss of weight, general malaise, irregular menstruation. Now moderate bleeding and foul discharge from vagina.

Specimen removed at surgical operation consists of a uterus and adnexa. The uterus is moderately enlarged and in the fundus, chiefly the posterior wall, is a ragged, friable, reddish-gray mass, three by two and a half centimeters in diameter, with ill-defined margin, projecting unevenly into the uterine cavity. The specimen is observed and handled freely by the ten students composing the section and each commits himself on paper to the possible diagnoses in the order of their probability. Mr. A. regards pregnancy as likely, Mr. B. thinks new growth more probable and makes a diagnosis of adeno-carcinoma. Mr. C. believes the case can be explained by tubercular endometritis and phthisis; Mr. D. thinks the condition may be an acute endometritis due to induced abortion; Mr. E. believes it may be a polyp which has undergone necrosis, and so on.

Other possibilities are discussed and the students are asked how an absolute diagnosis could be made before operation. Mr. F. replies " By examining scrapings from the uterus;" then follows a discussion of the value of histological examination of uterine curettings, the precautions and technique. Mr. A., with two members of the section as assistants, after briefly soaking a snipping of the specimen in water to free it from the glycerine of the preserving fluid, makes frozen sections, stains with a simple stain, such as Loeffler's methylene blue, mounts it in water or glycerine, and within five or ten minutes the three men have sections to demonstrate to the other members of the quiz (and it is surprising what excellent frozen celloidin sections can be made from old gross Kaiserling specimens).

Mr. A. believes that the section confirms his gross diagnosis of pregnancy. He points out large cells, which he regards as decidual cells (a fine hair fastened on the diaphragm of the ocular and extending toward the middle of the field makes an excellent pointer). Mr. B. thinks these large cells indicate a malignant tumor. It is suggested that other large cells are often mistaken for decidual cells. Mr. A. has been unable to demonstrate chorionic villi and Mr. C. thinks better sections may help in absolute diagnosis. He is given a characteristic fragment of the specimen in absolute alcohol (bottle No. 1), told to change it to absolute alcohol and ether, equal parts, (bottle No. 2) at three o'clock in the afternoon, and to put it in thin celloidin before going to bed, and to report to one of the laboratory technicians the next morning early enough to be shown how to block the specimen, harden it rapidly in chloroform, or 80 per cent. alcohol when there is less hurry. In a short time he cuts and stains the section and again demonstrates to the other members of the quiz; now he has changed his diagnosis to malignant tumor of the uterus, probably sarcoma. It is pointed out that some of the so-called sarcomata are, by special methods of fixation, section and staining, proven to be malignant tumors of smooth muscle origin; or of striated muscle, nerve or endothelial tissue. Paraffin sections of this tumor stained by eosin-methylene-blue, Mallory's connective-tissue, and phosphotungstic-acid-hematoxylin methods are demonstrated, showing the coarse myoglia fibrils characteristic of smooth muscle tissue and numerous mitoses.

In this way the students learn, not only facts, but how to find them out, each for himself; they learn the simple histological technique and see its advantages for checking up and making more exact their gross diagnoses; they also see the limitations of these methods and learn something of the value of special methods. All this is not done as drudgery, but with the incentive of competition and the idea of making an absolute diagnosis in a concrete case, a diagnosis which cannot be disproved by their fellows and will stand, if need be, in a court of law.

Case II. *Cerebral Syphilis with Multiple Gummata in Lungs, Liver and Spleen.*—Autopsy specimen. Man, 29; unmarried. Found dead on street. Said to have been a hard drinker and to have been subject to "fits" for past few years.

Quiz sections discuss descriptive autopsy protocol, and study case specimens (composite if need be), also museum or fresh specimens illustrating processes which are related to or may be confused with those seen in this case. Newer laboratory methods of diagnosis are learned or repeated which may render the gross and histological examination more conclusive. These include demonstration of Wasserman test, butyric acid and cell count from blood and cerebrospinal fluid respectively, from a positive syphilitic, as well as methods of demonstrating spirochætes. Again the students see the limitations of absolute diagnosis by gross appearance and sections as ordinarily prepared and learn the value and limitations of the newer methods of diagnosis, not in the abstract, but as applied to a concrete case.

Case III. *Malignant Papillary Adeno-cystoma of Ovary with Multiple Implantation Metastases.*—Brief clinical data, autopsy protocol, museum specimen and slides; for differential diagnosis, discussion of varieties of ovarian tumors and modes of metastasis.

Case IV. *Acute Endocarditis, Multiple Emboli with Abscess Formation in Brain, Spleen and Kidneys, Acute Gangrenous Endometritis, Thrombo-phlebitis of Uterine Veins, Placental Fragments.*—Woman, 36; married; 5 children. When first seen by physicians was in dangerous condition, conscious and appeared to understand what was said to her but was unable to reply (motor aphasia), marked focal cerebral symptoms; no history could be obtained from patient. Neighbors said she had been beaten by husband, who was placed under arrest. Autopsy and museum specimens and slides for diagnosis, discussion of acute infectious circulatory disturbances, causes and results; medicolegal bearing of this and other cases of induced abortion.

These four cases have been successfully used as indicated and are cited to illustrate the wide range of subjects which may be covered, the opportunity for active discussion and competition, comparison of typical and atypical cases, and the acquisition of the simple forms of technique. These exercises not only serve to impart knowledge but "to inculcate methods by which knowledge may be gained—methods of observation and interpretation."[1]

"Such a plan presents conditions worthy of an instructor of the widest knowledge of both medical science and medical practice, one who is keen and ready and accurate. In his close relations with the students in the conferences he occupies a position of far greater importance than lectures can possibly give him in securing the knowledge and skill and in determining the ideals of young men who are looking forward to the work of the physician."[3]

By such a plan " the students fix their knowledge by unifying it, by bringing the new information into relation to that already secured. They learn the use of their authorities as books of reference, and they must study their matter from day to day, for judgment and reasoning and skill in analysis cannot be crammed in the few weeks before an examination."[3] There is ample opportunity for skill and stimulus of the instructor in emphasizing the necessity for and directing supplementary reading, in showing the bearings of anatomy, histology, chemistry and physiology and pointing out the relation to clinical work, thus leaving the student with an idea of the entity and practical value of his actively acquired knowledge.

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NEUTRAL-TINTED GLYCERINE-JELLY AS A MEDIUM FOR THE MOUNTING OF PATHOLOGICAL SPECIMENS.

By A. A. BRUERE, M. D., and J. KAUFMANN, M. D.

(McGill University, Montreal).*

Of the many methods employed by museum workers in making permanent mounts of anatomical specimens in gelatin none can be said to be wholly satisfactory, owing to the tendency on the part of the medium to shrink in course of time, with the formation of air spaces, and to the difficulty of getting rid of the amber color of the gelatin.

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* Republished from the *Journal of Anatomy and Physiology*, Vol. XLIV, p. 345.

In our search for an unshrinkable medium for permanent mounts, after trying several media, we have chosen glycerine-jelly as that suited for the purpose. This jelly has been employed as a medium for small mounts, such as embryos, and its usefulness for larger mounts was thoroughly tested by one of us so long ago as sixteen years. Owing to the difficulty experienced at the M'Gill Pathological Museum in making permanent mounts in solid media by the methods now in vogue we have again given glycerine-jelly a thorough trial with most gratifying results, and have improved upon the method first used, by preparing a jelly of almost neutral tint. It is our object in this note to draw the attention of museum workers to the value of glycerine-jelly as a solid medium for the permanent mounting of pathological specimens.

Preparation of the Jelly.—" Gold Label " gelatin is carefully washed, leaf by leaf, in clear, cold water and then rinsed in distilled water. The dust-free gelatin is then allowed to soak in distilled water, contained in a large museum jar or other suitable vessel, until it is thoroughly impregnated with water. A stay of from twelve to twenty-four hours in water, at room temperature, will ensure thorough softening of the gelatin, the water being changed once or twice if need be. After draining off the surplus water by straining the water-logged gelatin through cheese-cloth, the volume of softened gelatin is measured, and an equal volume of neutral glycerine is added to it. Pour the mixture of soft gelatin and glycerine into a double boiler and heat at 100° C. for half an hour with frequent stirring. The time may be varied according as the amount of material to be liquefied is small or large. The glycerinated gelatin is then allowed to cool at about 40° C., and the whites of three eggs, well whipped, are added in the proportion of the whites of three eggs to half a gallon of " melt " and the whole well stirred. Replace the mixture in the boiler, and steam at 100° C. for about half an hour, or until the albumin is well coagulated. Filter while hot through absorbent cotton, by the aid of a hot-water funnel, into small jars. The filtration may be carried on in the Arnold sterilizer.

Acting upon the suggestion of Roussy, who has employed crystal violet to neutralize the yellow color of gelatin, we have made use of this dye to rid glycerine-jelly of its amber tint. After several trials, five drops of an aqueous solution of crystal violet (1 in 100), added drop by drop, have been found sufficient to neutralize the yellow hue of two quarts of jelly. It is, however, preferable to add the solution of the dye drop by drop, using one's judgment in deciding when the required neutral tint has been attained. Should the violet color be slightly in excess, more of the amber-colored jelly may be added to neutralize it. The principle of Roussy's method is evident. Violet being complementary to yellow, it in a measure neutralizes it when the two are blended.

The finished jelly, containing as it does about 50 per cent. of glycerine, keeps perfectly well without the addition of any other preservative. Formalin (40 per cent.) may, however, be added in the proportion of 1 to 1000 (of formalin—not of formaldehyde) to serve the double purpose of germicide and hardening agent. That the addition of an antiseptic to the glycerine-jelly is unnecessary is shown by the fact that the jelly, kept in uncovered Petri dishes for six months, remains free from moulds.

Infiltration of Tissues prior to imbedding in Glycerine-jelly.—After fixing in Kaiserling's solution when it is important that the natural colors of the specimens shall be preserved, or in formalin, the specimens are removed from the fixing fluid and the surplus fluid allowed to drain off. This done, the specimens are successively put through three strengths of glycerine—50 per cent., 75 per cent., and undiluted glycerine—in each of which they are allowed to remain for from sixteen to twenty-four hours, according to their size. They are then transferred to liquefied glycerine-jelly and are kept at 37° C. for another twenty-four to thirty-six hours, after which they are ready to be permanently mounted. In the case of large specimens a final transfer to fluid glycerinated gelatin at 37° C. may be necessary. The specimens being thus thoroughly infiltrated are finally permanently mounted in fresh jelly.

Permanent Mounting of the Specimen.—If the specimen is to be mounted in a museum jar, support it in the required position in the center of the jar by a fine thread attached above to a piece of glass rod placed crossways, pour the gelatin into the jar, filling it as nearly as possible to the top, allow it to set slowly (eight to ten hours), then cut the supporting fine thread and draw it out. Now pour a little very hot gelatin on the top; this will gradually obliterate the track of the thread, and the cover may be applied and the jar sealed. (The manner of putting on cover and sealing will be described in the next paragraph, when mounting in Petri dishes is considered.)

Let us suppose the specimen is to be mounted in a Petri dish. Choose a Petri dish which will hold the specimen more less snugly, the less the spare space the smaller the thickness of gelatin through which the specimen is looked at. Everything being ready, the prepared gelatin is melted by depositing the flask containing it in warm water, the water being gradually heated up till the mass is entirely liquefied. Fill the Petri dish one-third full of gelatin, and carefully deposit the tissue in it, lowering first one corner, and so on gradually till the specimen lies flat in the dish, occupying the center, and the most important surface of the tissue face downwards, as this will be the upper surface when the mounting is completed. The importance of these preliminary steps can hardly be too much emphasized, as it is then that one begins to be troubled by air-bubbles; careful pouring of the gelatin and careful imbedding of the tissue will save considerable time. To remove bubbles which have collected underneath the specimen, insert a warm hooked wire underneath the tissue and carefully work the bubbles out; or, what is more simple and even more successful, simply place the Petri dish on a warm surface, and the bubbles will be gradually expelled. The procedure being thus far successful, the dish is now filled with gelatin almost to the edge and is set aside, carefully covered, for about six to eight hours, to allow the gelatine to set gradually. At the end of that time, everything being satisfactory, we proceed to enclose the specimen permanently. Square sheets of plate-glass measuring about 3/16 of an inch in thickness, and of sufficient size to extend about 1 to 1½ inches in every direction beyond the Petri dish, make the best covers. The sheet of glass to be used is carefully cleaned and held under running cold water. The stock gelatin is again liquefied in hot water, and a sufficient quantity of it is poured into the Petri dish to raise its level above the edge of the dish; this done, the wet plate-glass cover is now applied to the dish in one of two ways: either first, by sliding the cover over the dish, beginning at the edge, and carefully dragging it over the mouth of the dish till it is entirely covered, or, second, by applying the surface of the plate to the dish at an angle and carefully lowering it till it is covered, the superfluous gelatin running off as the plate-glass is lowered. The first method has given us the best results, because in sliding on the cover, as the opposite end of the Petri dish is approached, more gelatin can be added if the quantity already there is insufficient to enable the dish to be sealed without the inclusion of air. The cover being applied, it may be carefully arranged so that the Petri dish lies exactly in the center. The gelatin is now allowed to set for about twelve hours; it is important that no weight should be placed on the cover as, in our experience, when the cover is weighted before the jelly has set air-bubbles appear in the mount. When the gelatin is set, the Petri dish and cover are together carefully raised, and the mount is reversed, so that the dish now rests on the cover. The superfluous gelatin is carefully wiped away, and the cover may now be settled permanently.

Sealing.—The cover may be sealed either by plain xylol balsam or by a mixture of xylol balsam and oil of cloves. The latter mixture has been most extensively used by us. This cement is carefully painted all around into the angle between the cover and the dish, and allowed to set for a few hours, when a second coat is applied; in about thirty-six to forty-eight hours a final coat of the oil-of-cloves balsam is applied, and when this is dry the specimen is ready to be sent into the museum when it has received its reference number. Before finally imbedding, each specimen has a small reference tag attached to it; this is so arranged in the gelatin that the reference can be seen from either the front or back of the mount.

Up to the time of writing we have mounted several pathological specimens, *e.g.* nutmeg liver, metastatic carcinoma of the liver, tuberculosis of the lung, hypernephroma of the kidney, tuberculoma of the brain, human ovum, etc., etc.

In the entire working out of the method both the time and money expended have been carefully recorded, and there is no doubt that it is economical in both directions. One pound "Gold Label" gelatin yields one gallon of the prepared jelly, requiring about 4 liters of glycerine. This quantity will suffice to mount about twelve specimens in Petri dishes measuring 5½ inches in diameter by 2/3 inch in depth.

In conclusion, the following important results especially recommend the use of this method:

(1) Its resistance to liquefaction in the hottest days of summer.

(2) The neutral tint of the jelly, which does not in any way interfere with the natural colors of the specimen.

(3) The thorough infiltration of the tissues by passing them through successive strengths of glycerine and glycerine-jelly, preventing contraction and development of air-spaces so troublesome in the past.

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Roussy, *Compt. rendus hebdom. de la Soc. de Biologie*, Feb. 26, 1909, p. 308.

Later Observations.—Since this article was sent to the press, a little over a year ago, we have noticed that the neutral tint of jelly fades considerably in the mounts. This is not the case, however, when the jelly stands in its flasks. There is, therefore, some reason for this disappearance of the color when the jelly is brought in contact with the tissues. In order to prevent this fading of the violet tint we have endeavored to use mordants to fix the dye in the jelly. The addition of a few carbolic-acid crystals to the methyl violet solution seems to serve the desired purpose, for several of the specimens mounted in the jelly treated in this way seem to give the desired result, as far as we can say at present. The crystal violet does not in any way dye the tissues.

In regard to liquefaction of jelly we may state that we have not had a single specimen liquefied; even abscesses in glanders and tuberculous broncho-pneumonia having stood well. Lobar pneumonia has, however, not been tried.

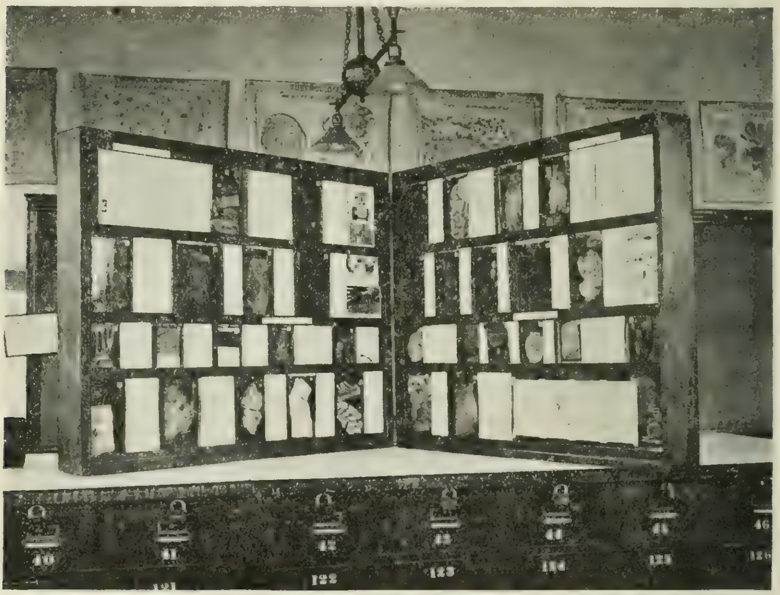
J. Kaufmann.

A PORTABLE MUSEUM CASE.

Henry Albert, M. D., State University of Iowa.

All museum workers have experienced the difficulties incident to packing and transporting individual museum specimens, the danger from breakage of jars if not properly packed or carefully handled, and the annoyance incident to the labeling of such specimens and keeping them properly arranged.

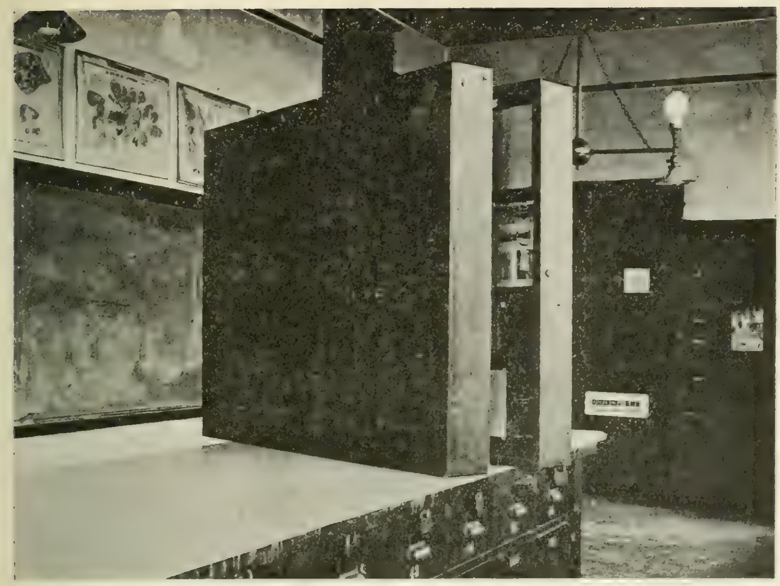
A few years ago, in response to a demand on the part of a number of organizations and places in Iowa for an exhibit of pathological specimens illustrating the lesions of tuberculosis, I prepared a museum case which was readily portable and so convenient that simply removing the case from the crate and opening the case made it ready for exhibition.



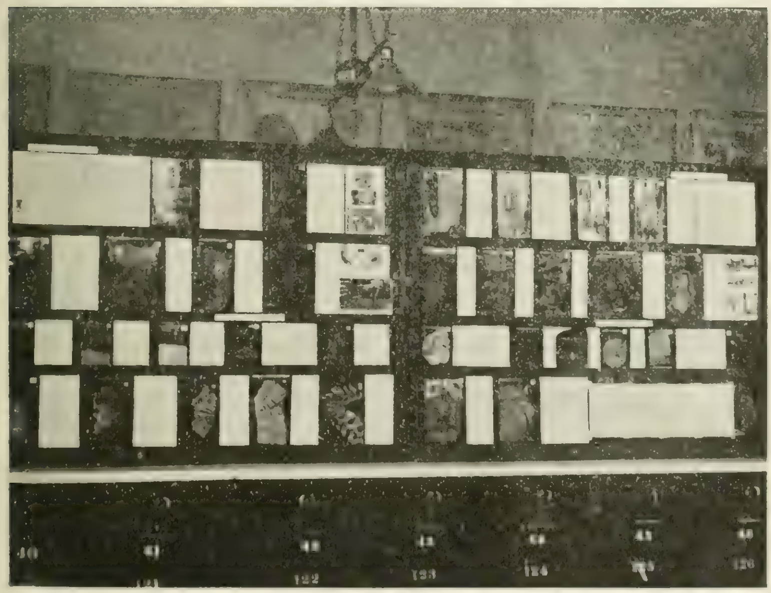
Photograph No. 1.—Case Half Open.

In the belief that such a problem may confront others, I shall describe the case which I had prepared, thinking that it may contain features that may be of value in the construction of others.

The case consists of two parts of equal size, into each part of which museum jars may be fastened. Each part is 4 feet long, 3 feet wide or high and 4½ inches thick, which means, considering that it is made of wood (oak) ¾-inch thick, that it has a



Photograph No. 2.—Case Nearly Closed.



Photograph No. 3.—Case Open.

depth of 3¾ inches. The space in each case is divided off into smaller spaces for museum jars and labels, by the use of soft wood ¼-inch thick.

The museum jars are of the rectangular type, the lids being fastened by means of marine glue (Binney & Smith, N. Y. City). The jars being of variable size, the case must be partitioned off accordingly. A layer of cotton is placed at the back, on the sides and top and bottom of the jars. They are held in place by thin strips which are fastened to the cross partition walls overlapping the bottom of the jars above and the top of the jars below the partition. Inasmuch as the case above described was designed to be used without the necessity of a demonstrator, it was deemed advisable to describe the lesions in considerable detail and to refer to the significance of such instead of simply labeling the jars. The light-colored areas seen between the jars in Photograph No. 1, represent the type-written descriptions covered with celluloid (fastened together by the alcohol hot-roller method), then pasted to a false (elevated) bottom in the case so as to bring the type-written description to a level with the front of the jar.

One end of each of the two parts of the case is fastened together by means of hinges so that the case may be closed when it is to be transported. The closed case is then put in a crate. When it is desired to place it on exhibition, it is simply removed from the crate and opened.

Notes on Technique.

ON THE LIQUEFACTION OF GELATINE.

By Lawrence Rhea, M. D.,

Harvard Medical School, Boston, Mass.

In the Department of Pathology of the Harvard Medical School most of the gross specimens are fixed according to Kaiserling's method. Selected specimens fixed according to this method are embedded in gelatin. This has proven very useful and fairly satisfactory. The greatest objection to it is that the gelatin about some of the specimens, sooner or later, becomes liquefied. In going over our mounted specimens certain things were noted that may have some bearing upon this question. Liquefaction of gelatin is most marked during the summer, and this liquefaction occurs most frequently about specimens in which acute inflammation was present. These observations suggested to me that there might be some relation to enzymic action and the liquefaction of gelatin. I made a number of experiments, the details of which I shall not give. From these experiments, the following conclusions were drawn:

1. At least four years after the specimens examined had been fixed according to Kaiserling's method and embedded in gelatin, the enzymes of the leucocytes have the ability to produce liquefaction of coagulated blood serum and gelatin.
2. Formalin, added in the same proportion as is used in mounting specimens in gelatin, does at least for a time, prevent the liquefaction of coagulated blood serum and gelatin. If time enough is given this amount of formalin may only retard this liquefaction.

Experiments are now being made, which, I hope, will throw further light upon the subject.

NOTES ON ANATOMICAL METHODS.

By Dr. E. Hamilton White,

Royal Victoria Hospital, Montreal.

Method of Preparing Permanent Anatomical Specimens of the Middle Ear and Nasal Accessory Sinuses. (Method of Semper and Riehm.)—The following method has been found useful for the preparation of permanent anatomical specimens of the middle ear and nasal accessory sinuses in which both bone and soft parts are to be preserved. The material is kept for some days or weeks in 5–10 per cent. formaline solution. The dissection desired may be carried out at this stage or at the end of the process. The material is then washed in running water for twenty-four hours to get rid of the formaline. Dehydration is carried out by passing specimen through two changes of pure acetone 1–2 days in each. The final solution is oil of turpentine, in which the specimen remains 2–4 weeks with one change.

After removing from the turpentine it is wiped off with a towel and allowed to dry in air. This requires about 2–3 weeks, after which it may be colored as desired. The membrana tympani is rendered transparent by the application of fine picture varnish, and I have found it of advantage to varnish the whole preparation with the same material.

Method of Bone Maceration. The Teichmann, (Anat. Anzeiger, 1887, 5, 461.)—The method employed for maceration of temporal bones is much the same as described in the last bulletin by Mr. Izzard.

The bones are taken fresh from the cadaver and placed in a glass jar with distilled water. They are kept at body temperature in a bacterial incubator for ten days to two weeks.

It has not been found necessary to change the water, though this may be of advantage. The cleansing is accomplished with a solution of hot washing soda and the bones afterwards bleached with peroxide.

The two methods are presented with no pretence of originality, but on account of their usefulness for preparing teaching specimens. They were brought to my notice by Prof. Siebenmann's* clinic in Basel, and have been fully described by him, along with other valuable methods, in his work on the Anatomy of the Ear.

ON A NEW AND RAPID METHOD OF INDELIBLY LETTERING GLASS MUSEUM JARS.

By Dudley Bell, M. D.,

Granville, Yukon.

The method is essentially the cutting of a ground-glass lettering on a plane glass field, by the employment of an apparatus in daily use among dentists, namely, a dental engine provided with a tiny grinding wheel (or disc, as it is called). For use, the disc is caused to revolve rapidly and is brought into intimate contact with the smooth surface of the jar, and moved about while it leaves a trail of opacity behind it, which may be made to assume the form of letters or figures, etc., at the will of the operator. This lettering or numbering may be done on a specimen jar or other plane glass surface nearly as rapidly as one writes with a pencil and with about the same legibility. The more pains the better the letter. The flexible arm of the dental engine is essential, as for writing there must be a free movement of the grinding disc in all directions.

The discs used are of carborundum and are procurable at all dental supply houses. The sizes used ordinarily are .25 cm. thick or less, and 2.5 cm. down to .25 cm. in diameter. The large discs make a broad mark and are suitable for large letters.

The hand piece of the engine is grasped as one would grasp a pencil, only much more firmly, for the disc is very prone to roam rapidly away from its work as its surface bites into the glass, and if not held steadily it may cut loose and make some erratic demonstrations upon regions not originally intended. Notwithstanding the proneness of the disc to roam, a few minutes' practice with it enables one to write quite legibly, and more practice makes one quite proficient. The two lesser fingers of the writing hand may be used as guards by being held firmly against the surface to be written upon. A person with a talent and liking for good lettering may do beautiful work with comparative ease.

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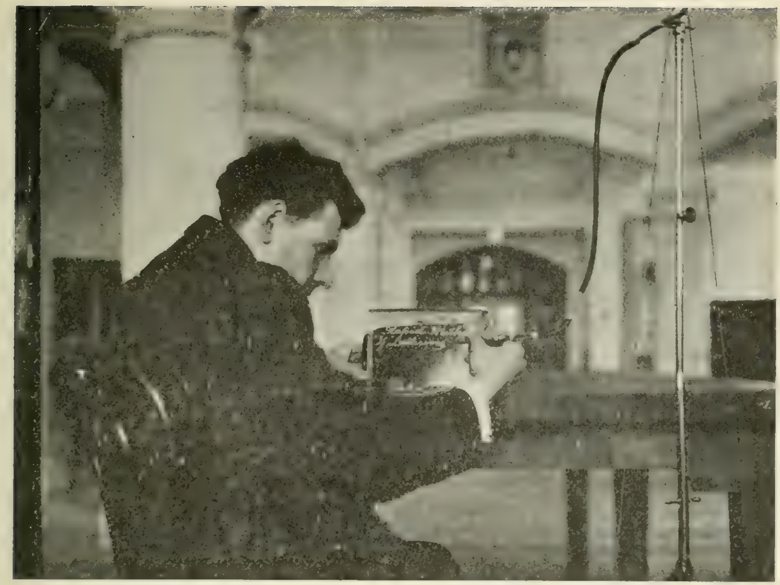
* Bardeleben-Handbuch der Anatomie des Menschen. Section on Middle Ear and Labyrinth by Prof. Siebenmann, Basel.



RAPID METHOD OF LETTERING MUSEUM JARS.

For some uses this is a superior method of lettering. It has the following advantages: 1. It is indelible; 2. May be washed repeatedly without soiling it; 3. May be made as artistic as one's ability will permit; 4. Is as easily applied as any written label.

Where necessity demands a removal of this lettering the same means may be employed as was used in placing it. The disc grinds the letters out, making a rectangular surface more or less regular in outline, according to taste. This area properly prepared leaves a smooth ground glass surface that may be used as a place to write upon with a pencil. A new label may now be ground in another location.

Experience Department.

As a result of the discussion "On Methods of Preservation of Specimens in which the Natural Colors have been Retained," which took place at the last meeting of this Association on May 3d, 1910,* it was resolved that "Experience Circulars," to consist of series of questions upon matters of practical interest to Museum workers, should be circulated from time to time, the replies received to be published in the Bulletin. The first of these circulars was drawn up by the President, Prof. A. S. Warthin, and was sent to all the members by the Secretary on November 18th, 1910. Replies were received from the following sources:

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* See report of this meeting, Discussion 2, of this Bulletin.

Prof. Johannes Fibiger, Copenhagen, Denmark.
Prof. Dr. Ludwig Pick, Berlin, Germany.
Dr. R. de Josselin de Jong, Rotterdam, Holland.
Prof. Pierre Marie and Dr. Gustav Roussy, Paris, France.
Dr. D. S. Lamb, Army Medical Museum, Washington, D. C.
Dr. Thomas Ordway, Bender Hygienic Laboratory, N. Y.
Prof. Henry Albert, University of Iowa, U. S. A.
Prof. A. S. Warthin, University of Michigan, U. S. A.
Prof. H. E. Robertson, University of Minnesota, U. S. A.
Dr. Charles Higgins, Ottawa, Canada.
Prof. Joseph MacFarland, Philadelphia, U. S. A.
Prof. R. M. Pearce, University of Pennsylvania, U. S. A.
Prof. J. J. Mackenzie, Toronto, Canada.
Dr. Oskar Gruner, Royal Victoria Hospital, Montreal.
Prof. W. Ophuls, San Francisco, California.
Dr. Joseph Kaufmann and Mr. E. L. Judah, McGill University, Montreal, Canada.

The great practical value of the contributions received proves the usefulness of this method of eliciting information and is a guarantee of the future success of this Department. Prof. Warthin's letter of enquiry is given below, and is followed by the various replies, the clauses of which are numbered to correspond with the numbers of the questions asked.

EXPERIENCE CIRCULAR NO. 1.

On the Preservation of Natural Color in Museum Preparations.

Enquiry made by Prof. A. S. Warthin, President International Association of Medical Museums, University of Michigan, Ann Arbor, Mich.

Replies addressed to Dr. Maude Abbott, Secretary International Association of Medical Museums, McGill University, Montreal, Canada.

" To the Members of the International Association of Medical Museums.

" One of the most difficult problems of the pathological museum is the preservation of specimens in their natural colors, either for exhibition purposes or for class demonstration.

" When the supply of fresh material is abundant, the attempt may be restricted to the preservation of typical or rare specimens; but when material is scanty, the need of a method that will preserve tissues in a way somewhat approaching the natural appearances becomes great. To meet the needs of laboratories and museums situated under such circumstances, the development of the best possible methods of color preservation becomes a matter of great importance to all interested in medical museums. It may be taken for granted that every member of this Association is interested in this problem, and has had practical experience of his own that would be of value to his associates. To collect these individual experiences, and to make them available to all, is the object of the experience-circular given below. It is hoped that the members of the Association will send in to the secretary answers in full to the questions given, so that these may be arranged and published in a later number of the Bulletin. Such an exchange of experience cannot fail to be of very great value. A return of the answers by January 15th is desired."

ENQUIRY.

1. Give in detail the method which, in your own experience, has yielded best results (or state where described, if published by you).

2. Mention any personal modification of method.

3. Describe results in so far as color is concerned, stating colors preserved, colors fading or not preserved, changes of color, heightened or lowered, contrasts, etc.

4. State length of time that such color preparations can be kept without deterioration.

5. State effects of light.

6. State effects of heat.

7. State effects of exposure to air.

8. Method of preserving for exhibition. State type of Museum jars used, method of sealing jar, etc. (or where described).

9. If preparations are used for demonstration purposes, state manner of keeping specimens and method of using them.

10. Give experience with moulds and bacterial infections. Methods of prevention.

11. Give results of experience with gelatine or jelly methods, with particular reference to the occurrence and the prevention of liquefaction.

12. Is it, in your opinion, worth while to attempt the preservation of colors in Museum specimens as standard or stock preparations when the supply of fresh material is sufficient for teaching purposes?

13. Suggestions as to methods of using color preparations for teaching purposes.

14. Give cost of method, amount of care necessary to keep preparations in best condition, and frequency of renewal ?

REPLIES.

I.

On the Method Used for Preparation of Museum Specimens and Preservation of Natural Color in Museum Preparations at the Institute of Pathological Anatomy of the University of Copenhagen. By PROF. JOHANNES FIBIGER, M. D., Director of the Institute.*

1. *Methods Preferred.*—At the Institute for pathological anatomy of the University of Copenhagen the formalin methods have been used for about 14 years for preparation of museum specimens. During that time nearly 2,500 specimens have been produced, 1,600 of which are now exhibited in the museum and the students' collections of our Institute. The remaining part is either stored or destroyed as unfit for exhibition use. The preparation method used here at the Institute was originally that of *Melnikow-Raswedenkow*, and during the years 1897-98 a considerable number of splendid preparations were made according to this method. The reasons, however, why now I generally prefer the method of Kaiserling are as follows:

(1) Thin objects, *e.g.*, intestines, are apt to shrink and become too hard and stiff when prepared by the Mel.-Ras., method.

(2) The preparation of larger objects, as f. inst. whole livers, has proved more difficult by this method than by that of Kaiserling.

(3) In such parts of the organ as are placed absolutely near to the formalin, the accumulation of pigment in the parenchyma will increase to such an extent as to greatly impede any microscopical examination later on.

2. *Personal Modifications.*—At our Institute the methods of Mel.-Ras. and Kaiserling are carried out according to the authors' prescriptions, the correctness of which I am happy to certify. We use the same formalin solution as indicated by Mel.-Ras. and Kaiserling. We have made no great changes, but a few technical details might perhaps be of interest to others, and I should like to give in the following pages a short account of our manner of proceeding.

In order to obtain faultless preparations—no matter which method is used—the following primary requirements must be maintained:

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* Centralblatt f. allg. Path. u. Bact., 1898, Bd. IX, p. 299.

(1) The objects in question must be exposed to formalin influence as early as possible. The best thing, therefore, is to start the preparation directly coincident with the post-mortem examination (or operation).

(2) If the preparation chiefly concerns the surface of the organ, this part is to be carefully cleaned so that no pollution is left, later cleaning being far more difficult, if not impossible. Previous to preparation the organ must be carefully washed with Kaiserling's formalin solution, and if necessary wiped off with absorbent cotton, drenched in formalin. Pollution caused by blood or pus may be of great inconvenience, worse still is pollution by bile, which in fact it is often impossible to do away with completely. When parenchyma slices are prepared a layer of blood on the surface of the cut, as mentioned by Mel.-Ras., will often be of great consequence. Later on, however, it must be carefully removed by cutting away the upper part or by a thorough wiping.

(3) It is absolutely necessary to take precautionary measures in order to keep the shape of the organ unchanged. During the formalin treatment the organs are to be kept in spacious containers, so as to lie widely outstretched. The support must be quite plain and must yield to any pressure, uneffaceable impressions being otherwise likely to arise at the base of the organ. The support, therefore, in all cases must be made of absorbent cotton, saturated with the preparation liquid. Cavities of the organs must be stuffed with cotton or injected with the fluid, or fixation will make them turn out in an unnatural shape.

As preparation basins a square box made of enamelled iron (dimensions 80 x 47 x 16 cm.) is used here at the Institute. The cover of the box is very tight-fitting, and on it a projecting edge works in a groove inside the box; this groove filled with glycerine thus forms an air-tight space impenetrable for the formalin vapors. On the bottom of the box a layer of absorbent cotton is placed. As a rule a box of this structure may be used for a long period, provided the enamel is sufficiently solid. In the process of time, however, the enamel will be injured and the metal become exposed. The box then is of no use, large spots of rust being likely to spoil the preparations. At our Institute three such boxes have been used up in the past fourteen years.

For the *Kaiserling* method great quantities of formalin (formalin 800, water 4,000, acetic kali 85, nitric kali 45) always are required in order that the objects may be completely covered; parts rising above the level of the liquid frequently become unnaturally discolored. When very great quantities of fluid are required for larger preparations, as *e.g.*, for amyloid livers, the upper part of the tissue covered only with absorbent cotton, soaked in the fluid, a successful result is then rather doubtful (questionable).

To give any common rule as to length of time for the organs to be exposed to the influence of formalin is impossible. If the Kaiserling fluid is freshly made and the organ is of small dimensions, 24 hours will often be sufficient. Large objects require more time, and if the fluid has been used previously a preparation of 3 or 4 to 24 hours is demanded. If a hastening of the preparation act is wanted it will be of great assistance to heat the fluid; as far as I have experienced some tissues as *e.g.*, eclamptic livers only will turn out quite perfect when prepared in this way.

To tell distinctly when the formalin treatment is completed is of course to some extent a matter of practice. The best medications, according to my experience and the former statements of other authors, are as follows:

(1) The organs have obtained a great degree of hardness (livers f. inst. acquire the hardness of cartilage).

(2) The color of the tissue has turned dull greyish or greyish-red and all blood vessels visible have changed their red color into a black-red or bluish-grey color.

(3) No red liquid blood is anywhere to be expressed from out the blood vessels.

The organs must be frequently examined, and it must be remembered that even if the surface of the organ is completely fixed the inner part may yet be insufficiently treated. It is therefore necessary, as far as possible, to make incisions in order to permit further penetration of the fluid, or to make slices for further treatment. If only the surface of a large parenchymatous organ, as f. inst. the liver, is to be preserved, it will be wise to begin by a shorter formalin treatment of the whole organ and then excavate the tissue from the side, which is not wanted to be preserved; accordingly as the fixation advances the organ is gradually excavated until finally nothing but a fine rind of the tissue is left. To shorten the preparation, formalin may be injected. Injection is the best way to preserve the shape of cysts unchanged. As a matter of fact the technique is modified according to various aims and objects.

The Alcohol Treatment.—The organs when sufficiently treated with formalin must be carefully cleaned with water to hinder any formalin being left in the tissues and then they are put into alcohol of 95-96 degrees. This fluid very soon will turn turbid and change its color, and it is therefore advisable to use two containers for alcohol. The best materials for this purpose are big cylindrical glasses with cut-glass covers. The organs are first alcoholized for a couple of hours in one of the containers. Then the treatment is completed in the other one. The alcoholization varies in time according to the dimensions of the organ and the quantity of alcohol. Great quantities are to be preferred. In order to shorten the alcohol treatment an agitator connected with a motor or a water turbine is employed for stirring the fluid. This method, however, must be practiced with the utmost care or the texture of the tissue is likely to be injured. The treatment must not be carried on for more than 8-10 hours. The greyish color of the organ changing into the original color of the tissue is a sign that the alcohol treatment is complete. The next treatment in a watery solution of acetate of potash and glycerine (water 300, pot. acet. 60, glycerine 15) must be varied according to the size of the organ.

As to the preservation of colors in special organs I should like to add:

Preparation of *the heart*, as a rule, presents no difficulties except fatty degeneration of the myocardium, a condition which we have not yet been able to present quite true to nature. If preservation of the shape of the heart is especially desired, the cavities must not be opened till the fixation is completed. The cavities in advance must be filled with the formalin solution. In case the valves are suffering, it is necessary before fixation to place the valves in their natural position by use of cotton.

Preparations of *the lungs*, on the whole, are easily made, broncho-pneumonic foci will, however, often be difficult to present, and so will the cut surface of fibrinous pneumonias. The best way to preserve the granular surface of the cut in these cases is by the method indicated by Mel.-Ras. Tuberculous cavities and bronchiectases want a careful stuffing with cotton, preceding hardening, or they will lose their natural shape.

The liver as distinct from the lungs is very difficult to prepare, and in process of time I have been forced to throw away numerous preparations of the organ, owing to their getting an unnatural icteric color while prepared. Satisfactory information as to the principal cause of this phenomenon cannot be given, I am sorry to say; in my opinion, however, heated formalin solution used in order to quicken the fixation will sometimes prevent the unfortunate color change. The same process is absolutely necessary in the preparation of livers with parenchymatic bleedings as found f. inst. in eclampsia as mentioned above. The contents of the gallbladder must always be emptied before the treatment of the liver, and the bladder be carefully stuffed with cotton to preserve its shape. When the organ has been left in the liquid for about 24 hours it will be wise to make incisions from the side not wanted to be preserved in order that the formalin may penetrate into the inner part of the parenchyma. The next day the hardened part of the parenchyma must be cut off and the process carried on of excavating and fixing the non-hardened parenchyma, so that the whole front of the liver will finally be left unchanged in shape and color. Hydropical gall-bladders must be emptied of their contents and afterwards injected with formalin. The pellucidity is preserved to the greatest advantage by glycerine gelatin hardened in formalin. A similar method is practicable by presentation of *gall-stones* in their natural position. The gallbladder is treated with formalin before being opened. It is cut open so that the concrements are not displaced and then filled with glycerine gelatin, the fixating remedy being quite invisible. Such preparations may be preserved for years and years without any changes.

The preparations of *the spleen* can offer great difficulties, especially in the preservations of leucaemical spleens the color is rather apt to change. In my opinion the best specimens are produced, by preparing slices of the parenchyma and then cutting off carefully the upper part of the surface. When preservation of the whole organ and the surface is desired the same process must be used as in preparation of whole livers.

The kidneys are profitable objects for preservation. The best result is obtained when the capsule is left untouched and no incision made in the parenchyma. After injection through the ureter, and ligature of the latter, all the organ must be let down into formalin. When one or 2 to 24 hours have passed, the formalin treatment will be completed, and the kidneys are then split by the ordinary autopsy cut and alcoholized. Urinary concrements are protected against dissolution by moulding in glycerine gelatin according to the method mentioned above. The method of Westenhoeffer I have not yet tried.

Preparation of *the brain* offers no greater difficulties. The best plan is to give the organ before anything else a preliminary formalin treatment and when the brain has become somewhat hard to make slices of it, or divide it by a horizontal cut. By preservation of the whole brain the fixation must be carried on under steady excavation of the parenchyma in the same way as mentioned for the liver. In the preparation of hydrocephalic brains the distended ventricles are injected by puncture with a canula introduced through a small hole before this is opened.

In the preparation of the various parts of the *digestive tube* special stress must be laid upon preservation of the shape. Previous to formalin treatment the œsophagus, the stomach and the intestines must be extended on pasteboard plates and prevented from getting displaced by cotton or needles.

The preparation of *bones* gives the best results by—

(1) Preliminary formalin treatment,

(2) Sawing through and further treatment in formalin.

When the preparation is completed the upper thin layer of the spongious texture and the bone marrow must be carefully removed by a file, the parts underneath showing then their natural color.

As a matter of course the technique mentioned here has been employed in the preparation of other organs, tumors and the like.

Duration of colors without deterioration. Effects of light and heat.—If the preparation has been successful the specimens will keep unchanged for years and years. In our Museum several preparations have been exhibited for 13 years and yet today look quite as well as on the autopsy table years ago. As far as I have experienced, preparations when exposed to light are not influenced by it, neither are they liable to change when placed in heated rooms.

Type of jars used, methods of sealing, etc.—Preparations made for exhibition purposes are here preserved in square jars with plain walls. The students' collection, however, contains a considerable number of preparations placed in cylindrical glasses provided with removable covers, so that a closer examination of the organs out of the glasses can be established. Preparations requiring a special position in the jars are mounted in these on plates of black, white or transparent glass. In former days we used plates of slate, but glass plates are more beautiful.

The organs are fixed to the glass plates by fine strings, conducted through the parenchyma in such a way as not to be seen from the side which is meant to be exhibited. Afterwards the strings are fixed to the glass plates through holes drilled in the latter. To make these holes has caused us a great deal of difficulty, but after numerous experiments we now use the following method: On a drill is placed a small 3-square sharp steel file strongly tempered. The glass plate is placed on an even support, and by turning the file quickly round while placed in the drill a small hole is made in the plate; after that this file is replaced by a very thin round file, and the hole thus is made somewhat larger. This method requires a great deal of practice, the glass plates being apt to crack by a heavy pressure or by too quick turning of the file. The chief benefit of this method is that the organs are placed free in the glasses, the strings being not visible from the front side. Small preparations are easily fixed by glycerine gelatin, but as this method does not always give the best results we do not use it any longer. The sealing of the covers must be done with minute exactness, the more so because the covers of the cheaper sorts of square preparation glasses most frequently are not quite even. For sealing is used a sticking fluid of caoutchouc, made by Leitz, and as further preservative a layer of red lead is put on the sealing line and a layer of asphalt-lac on the top of it, to make it look finer.

II. *Gelatin Method.*—The organs in our Institute are preserved in the commonly used solution of potassium acetate and glycerine (Kaiserling). This method is virtually used for all sorts of preparations. Preservation in glycerine-gelatin is very seldom employed on account of the great expense connected with this method, and the inconvenience in moving the preparations out of the glasses when microscopical examination is required later on.

Necessity for renewal of fluids. Cost of method, Importance of color preparations and value for teaching purposes.—Small specimens when mounted in jars with tight-fitting covers and plenty of liquid are not liable to suffer any changes in the process of time, provided that the preparation has been perfect. Sometimes, however, the preparations must be changed. This must be done when—

(1) The preserving liquid turns reddish, a fact which proves the formalin treatment insufficient.

(2) The preparation becomes grayish and loses its natural color. The organ then is not deprived of its formalin contents and the specimen must be restored by a renewed alcohol treatment. If too long time has passed since the preparation, this renewal, however, will be of no consequence and the organ is unfit for exhibition use.

On the whole I must emphasize that it has neither been necessary to change the liquid on successful preparations nor to replace it by others. It is, however, necessary to examine the preparations frequently, partly because the sealing of the covers may soon become loose, or because the glasses may crack or the labels be soiled. The preparations suffer a great deal when they are much used as teaching material to young students. On this account some years ago the staff of assistants at the Institute for Pathological Anatomy was enlarged with a curator, whose duty it is now to supervise the collections.

The use of formalin methods, to a great extent, weighs heavy upon the budget of an Institute for pathological anatomy. As far as I can judge it must, however, be considered bad economy where great quantities of liquid and as far as possible pure chemicals are not used. The pecuniary inconveniences, however, are greatly eclipsed by the inestimable advantage offered to the teaching of pathological anatomy in a museum rich in fine preparations. Even if a great supply of fresh material is at hand, it will never be rich enough for the lecturer always to dispense with series of preparations exhibiting various phases of any sort of disease in an organ. Only by illustrating the lecture with series of preparations is it possible to bestow upon the audience the right understanding of the morphological diversities of the illness. The modern formalin methods are not only advantageous to the teacher, but they also render it possible to establish students' collections, in which the students may read their text-books while

examining the natural preparations. A museum rich in formalin-treated natural preparations in my opinion is an indispensable supplement to the teaching of pathological anatomy, however abundant may be the supply of fresh material.

II.

From the Pathological Institute of the Friedrichshain City Hospital, Berlin, Germany. Prof. Ludwig Pick.

1 & 2. Die Details meiner Methode (der Karlsbadersalz-Formalin Methode) sind veroeffentlicht in Berliner Klinische Wochenschrift 1900, No. 41/42. "Ueber die Methoden anatomische Praeparate naturgesetzt zu conserviren."

3. Die Erfolge sind ausgezeichnet, nur werden alle ikterischer Toene mehr oder weniger grün.

4. Meine aeltesten noch immer vorzueglich erhaltenen Praeparate stammen aus dem Jahr 1898 (Anfang).

5. Die Praeparate sind in *verdunkelten* Kammer aufgestellt.

6. Hoehere Temperaturen (ebenso niedrige) mussen in den Museumraeumen vermieden werden, wegen des Platzens der Glaeser, und wegen des Abplatzens der Deckel.

7. Ich verwende meist die bei der Firma *E. Leitz, Berlin,* erhaeltlichen eckigen Praeparaten Glaeser; nur zu einem kleinen Teil Clyinder-glaeser. Als Kitt nehme ich den von der Firma *E. Leitz* gelieferten Praeparatenkitt; auch Gummikitt der Firma *Milersch, Berlin.*

8. Meine Praeparate werden in dieser Forme saemmtlich für die taeglichen Demonstrationen gebraucht.

9. Wenn die Glaeser und saemmtliche bei der Conservirung benutzten Gefaesse vor dem Gebrauch *stets gut und sorgfaeltig* mit warmem Sodawasser *gereinigt* werden, und bei der Conservirung der Praeparate gut verschlossen sind, so kann man in unserem Klima ohne alle antiseptischen Zusaetze auskommen.

10. Ueber Gelatinemethoden habe ich keine Erfahrung; sie sind fur meine Zwecke entbehrlich.

11. Auch wo reichlich frischer Material verhanden ist, werde ich die Conservirung in natürlichen Farben principiell empfehlen. Fuer die selteneren Objeckte ist sie an sich noetig, fur die haeufigeren deswegen, weil erfaehrungsgemaess ein frischer Praeparation einer Affection durchaus nicht immer dann zur Stelle ist, wenn man es grade gebraucht.

12. Ich pflege meine Museum-Praeparate stets selbst je einer Kleinen Gruppe von 5-6 Studente zu demonstrieren.

13. Die Kosten fur die von mir verwendete Methode sind hauptsaechlich abhaengig von den localen Preisen für Glycerin und Alkohol.

Wenn die Praeparate einmal sorgfaelitg aufgestellt sind und im Dunkeln und in richtiger Temperatur gehalten werden, bedarfen sie viele Jahre hindurch keine weitere Besorgung.

III.

From the Municipal Hospitals of Rotterdam, Holland. DR. R. DE JOSSELIN DE JONG, *Bacteriologist and Prosector to the Hospitals.*

In answer to your experience circular I beg to inform you of the following:

Ad I. The method I have had experience with is Kaiserling 1, (see *von Kahlden's Technik*, 1909, page 20).

Ad II. I use the following modification: Without having had any contact with water, the organs are rinsed with formol 10 per cent. and then placed in the following mixture: Kaiserling I: formol (pure), 1000; acet. kalic, 120; nitrat. kalic, 40; aqua destill, 4000.

After 1-3 or 4 days (this depends on the size) they are laid in alcohol of 70-80 per cent. until the natural color returns.

They are then placed in Kaiserling II, in which I leave them.

Kaiserling II: Glycerine, 1140; alcohol 96 per cent, 234; acet. kalic, 40; aq. destill., 3500.

Ad III. The colors are left intact, with the exception of icteric organs. In the long run bile colors are extracted.

Ad IV. Several organs have retained their color for more than four years.

Ad V and VI. Experience has taught me that it is wise to have ruby glass in the museum windows and also that the preparations bear cold better than heat.

Ad VII. Exposure to air and sunlight makes them lose their colors in the end.

Ad VIII. Several organs are kept in large cologne-pots, closed with wooden lids, but the greater part are in glass bottles, shut off either by vaseline or by asbestos seal (obtained from the firm of Salm in Amsterdam).

Ad X. Moulds and bacterial infections are prevented by adding a small piece of camphor.

Ad XI. I never use gelatin methods.

Ad XII. For common preparations I do not consider it necessary to preserve museum specimens as standard preparations, if the supply of fresh material is sufficient, but I most certainly do for *rare* or *interesting* preparations.

Ad XIV. The liquids are renewed once a year.

IV.

From the Laboratory of Pathological Anatomy of the Faculty of Medicine of Paris. PROF. GUSTAVE ROUSSY.

" Je répons à la lettre et à la circulaire que vous avez bien voulu m'adresser au nom de l'Association Internationale des Musées Médicaux, ceci aussi bien au nom de mon Maître le Professeur Pierre Marie qu'en mon nom personnel.

1. Je vous fais envoyer par ce même courrier un exemplaire d'un volume que j'ai publié l'an dernier avec Monsieur Ameuille et dans lequel vous trouverez les indications détaillées de la méthode que nous employons pour la conservation des pièces macroscopiques (conservation au Kaiserling modifié, conservation dans la gélatine glycerinée en boîtes de Petri, procédé de lutage des bocaux).*

2. Dequis la publication de ce volume nous avons remarqué qu'il était préfèrable de laisser les pièces plus longtemps dans le premier liquide, c'est à dire d'un *jour a quatre jours* suivant l'épaisseur des pièces.

4. Notre collection ne date actuellement que de trois ans ce qui fait que je ne puis vous donner de renseignements portant sur une plus longue echéance, à propos de la conservation des couleurs jusqu'ici toutes nos pièces conservent assez bien leur couleur il en est cependant quelques-unes qui pâlissent, ce qui tient probablement à ce qu'elles appartiennent aux premières pièces qui ont été montées par nos garçons.

7. Nous n'avons pas jusqui'ici remarqué que la lumière ait une influence très manifeste sur nos prèparations; malgrè cela nous évitons de les laisser exposées en plen soleil. Nos préparations en boîtes de Petri sont conservées dans une armoire peinte en noir.

8. Montage des pièces. La pièce préparée est fixée sur un cadre de verre ou montée sur une plaque d'opaline ou de verre. La couleur de la plaque sera de préférence blanc mat ou encore de diverses teintes, dans ce cas on cherchera à lui donner la couleur complémentaire de celle de la préparation.

Le tout est placé dans un bocal de verre qu'on a rempli de liquide conservateur neuf et bien filtré, on y a joutant un cristal de thymol pour éviter les fermentations. Il faudra enfin luter le couvercle avec un mastic pour éviter la pénétration de l'air extérieur.

Voici comment nous préparons le mastic qui nous sert a luter les bocaux, au laboratoire d'Anatomie pathologique:

1. Faire fondre dans une casserole 100 grammes de suif ordinaire;

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* La Technique des Autopsies et des Recherches Anatomo-Pathologiques a l Amphitheatre, par W. Gustave Roussy et Pierre Ameuille. Preface du Prof. Pierre Marie, Paris, 1910.

2. Couper en petits fragments de vieux tubes de caoutchouc (on se sert pour cela des tubes de lampe a gaz ou de bec Bunsen qui sont hors d'usage). On en pèse 200 grammes que l'on mélange au suif fondu. Le caoutchouc se dissoût à une temperature modérée en 7 a 8 heures;

3. Ajouter 200 grammes de talc de Vénise en tournant avec une baguette de verre jusqu'à ce que le mélange soit parfait.

Le lut est employe à chaud; en se refroidissant il durcit et doit être réchauffé pour chaque usage.

A noter que la fusion du caoutchouc dégage une odeur fort dèsagréable, ce qui oblige à faire ces manipulations dans une pièce a l'écart.

10. Pour éviter les fermentations, nous mettons quelques cristaux de thymol dans les bocaux et nous n'avons ainsi jamais de développement de moissisures.

11. Pour la conservation des pièces en gélatine glycérinée et pour éviter la liquéfaction je suis en train actuellment d'essayer des modifications qui consistent à laisser séjourner les fragments un ou deux jours dans la gélatine, à l'étuve a 37° C., avant de les couler dans une gélatine neuve.

12. Les pièces macroscopiques ainsi conservées nous sont d'une très grande utilité pour l'enseignement, elles nous servent dans les cours et les séances de démonstration et peuvent même être projetées au moyen d'un appareil à projections."

V.

From the Army Medical Museum, Washington, D. C. Dr. D. S. Lamb, *Pathologist.*

1 and 2. The Army Medical Museum follows the Kaiserling method with some modifications. The quantities of material according to that method are the same. The time of immersion in the fluids, however, varies, since the office hours and the times of receipt of specimens are from 9 to 4:30 o'clock daily. Again it does not seem to make particular difference whether the specimen remains a little longer or shorter time than stated in that method; this is especially true for the alcohol immersion; we use about 80 per cent. alcohol. A copy of the process used at the Museum follows:

"A modified method for preserving specimens of morbid anatomy.

"So far as known at present the Kaiserling process, or some modification of it, is the best means of preserving from decomposition and in their natural colors specimens of morbid anatomy. In order to get the best results, however, it is necessary that the specimens should be obtained soon after removal from the body,

whether by operation or post mortem examination. Such specimens should be carefully washed free of blood and other foreign matter, but should not be soaked in water. Between the time of removal and of receipt by the person having charge of the preservation, the specimens may be kept in dry cotton; gauze makes characteristic imprints on delicate tissues.

"The Kaiserling process consists of three stages: a first solution, a transfer to alcohol, and a third solution. These liquids should preferably be kept in large shallow dishes or jars, and when markedly discolored or showing a marked sediment should be replaced by fresh liquids.

"The first solution consists of water 1000 cc., formalin 200 cc., potassium nitrate 15 grammes, potassium acetate 30 grammes: dissolve. If the water is reasonably clear this solution need not be filtered. It hardens the specimen, and it is necessary, therefore, that the specimen should be "oriented," that is before immersion in the first solution it should be placed in such position as will retain the parts in the desired relations. Plates of glass or glass rods bent into the required shape may be used for this purpose. In specimens that include the gallbladder this had better be emptied previous to immersion; otherwise the bile is liable to soak out persistently and stain the solution. Large organs, as the liver, should be sliced into at intervals of about half an inch in order that the fluid may penetrate the interior; but in most cases a section of liver or other large organ, about one-half inch thick, will show as much as and sometimes more than the entire organ.

"Specimens are kept in the first solution from a few hours to two days, according to their thickness. They are then removed, rinsed with water and placed in alcohol, about 80 per cent. The first solution changes the red color of the specimen to a brown, by converting the hemoglobin into methemoglobin; the alcohol restores the red color. The reaction is prompt, but it is advisable to keep the specimen in the alcohol for from two to eight hours, according to its delicacy or thickness. Too prolonged immersion in alcohol, as is well known, causes the color to fade.

"The specimen is then removed from the alcohol, drained for a moment and placed in the third liquid, which consists of clear water 1000 cc., glycerine 200 cc., potassium acetate 100 grammes: dissolve and filter. Good filtering paper will do. If the specimen is to be permanently mounted in this solution it will be advisable to add one-half or one per cent. of formalin to preserve from mould, which is especially apt to attack intestinal preparations. But if the specimen is to be mounted in gelatin the formalin should not be added.

"To transport such specimens to a distance they may be placed in cotton wet with the third liquid, and then in a tin box soldered to keep from leaking; this box, protected by sawdust or excelsior packing, is then placed in a wooden box."

3. *Results.*—Many specimens are received at the Museum long after removal from the body; the results of the process for these specimens are of course largely dependent on the state in which they are received. If received in a fresh state the colors, reds and bile colors, are reasonably well preserved.

4. *Duration of colors.*—Some specimens now over ten years old, especially those of red hepatization, have kept color fairly well.

5. Many specimens in the Museum are exposed at times to direct sunlight, especially in the winter season, and there is reason to think that the direct sunlight tends to fade specimens.

6. Apparently the heat of the Museum does not affect the color.

7. The same may be said in regard to exposure to air. However, the specimens are not exposed to the air except for a few minutes at a time.

8. Some specimens are preserved in the Dorflinger round jars, with the glass ground stopper and hook. Others in square jars, the tops cemented. Others still in gelatin.

9. Specimens are removed from the jars if necessary to be demonstrated, but many can be sufficiently well shown in the jar itself.

10. We had trouble with moulds, especially in intestinal preparations, until we resorted to using a small percentage (a half or one per cent.) of formalin in all wet preparations.

11. The gelatin preparations have not been very satisfactory; some have kept well, others have liquefied; on the whole the results are discouraging.

12. Hardly worth while.

14. As the Museum is supported by appropriation of the National Congress, and supplies are bought by contract, it is not easy to answer the question of cost. There are employees who are paid salaries, and their work is not limited to the preparation of specimens. After the specimen is prepared, a few days to weeks is allowed to elapse before it is placed in the Museum. In some cases, after a further lapse of time, it becomes necessary to change the preserving liquid; in some other cases to fill up a jar that shows evaporation. In some gelatin preparations the gelatin has shrunken and that condition has to be remedied. The frequency of renewal is altogether an individual matter. Some specimens do not require it.

In conclusion it may be said that inasmuch as the Museum is a public Museum, for exhibition, the specimens in it are all exposed to ordinary daylight.

VI.

From the Bender Hygienic Laboratory, Albany, N. Y. DR. THOMAS ORDWAY, *Director.*

1. Kaiserling method employed.

11. My results with the gelatin and jelly methods while at Harvard, were so unsatisfactory and variable that I have not attempted to use such methods here. Recently I noted liquefaction in gelatin specimens which have been mounted for over three years, and were apparently in good condition until a few weeks ago.

12. In regard to a practical working departmental museum further experience shows that the outline mentioned in my paper "On the Teaching of Pathology by Gross and Microscopic Specimens" see p. 4 of this Bulletin) is of distinct teaching value.

VII.

From The Department of Pathology and Bacteriology of the State University of Iowa. PROF. HENRY ALBERT.

1. I use the regular Kaiserling method.

2. No personal modification.

3. Most of the colors are well preserved, more particularly those due to blood. The green of chloroma I found not to be preserved.

4. I have a number of preparations that have been preserved for ten years by this method without deterioration.

5. Strong light, especially direct sunlight, tends to cause the colors to fade and the preserving fluid to become cloudy.

6. Have noticed no effect from heat.

7. No effect from exposure to air except that due to growth of bacteria or moulds.

8. Museum jars used. Rectangular ones, also one which Bausch & Lomb made for me according to specifications given by me which represents a jar a little more than half of which is circular and the other representing a plain surface. This is of particular advantage to show both the natural and cut surface of many specimens. I also occasionally use the Whitall-Tatum cylindrical jars.

9. Specimens which I use for demonstration purposes are mounted in Kaiserling and most of the jars are sealed with marine glue so that they can not be removed.

10. I prevent the development of moulds and bacteria by placing small pieces of thymol in each jar.

11. Have used the gelatin method as described by me in the

Journal of the American Medical Association, Vol. XLVI, page 1993, June 30, 1906. The method is not original with me, although a certain method of demonstrating specimens is. I prevent the liquefaction of gelatin by adding a small amount of formalin to the gelatin.

12. I believe it is well worth while to preserve the natural color of specimens even though there may be an abundance of fresh material.

13. Specimens are used for teaching gross pathology, students being obliged to sketch and describe the specimens.

14. I do not find it necessary to renew the fluid on my specimens; the two precautions which I observe to make such unnecessary being first, the use of several pieces of thymol as a preservative, and, second, the keeping of specimens out of direct sunlight.

VIII.

From the Pathological Department of the University of Michigan, Ann Arbor, Mich. Prof. A. S. Warthin.

1. I have used the Kaiserling method as first described by him, without any personal modification.

3. Good color contrasts are obtained particularly in the case of the brain, kidneys, and tumors.

4. Specimens have been kept for five years without showing much deterioration. After that time the color gradually fades.

5, 6, and 7. Light, heat and exposure to air all cause more rapid deterioration, and specimens used for frequent demonstration rarely last more than one year.

8 and 9. The demonstration specimens are kept in large stone jars with vaseline seals and are taken out as required for demonstration. Those placed in museum jars are put up by the rubber-dam method described by me at the meeting in Washington in 1909.

10. I have had a great deal of trouble with moulds. The thymol method and other methods devised for the prevention of mould growth have been used without avail. Specimens of spleen and lymph glands have not been satisfactory because of the constant oozing of color, quickly causing discoloration of the third solution.

11. I have had a similar experience in the case of gelatine methods, finding it practically impossible to avoid liquefaction of the gelatine when spleen or lymph glands are preserved. My experience with the gelatine method has been very unsatisfactory, few of the specimens lasting more than one year. My most satisfactory preparations and those that have lasted the longest have been those put up by filling in the Petri dishes with layers of soft

and hard melted paraffin and allowing it to harden and then varnishing the back of the paraffin block with shellac. Some preparations put up four years ago by this method have resisted liquefaction, and still show beautiful color contrasts.

12. In my opinion it is not worth while to attempt the preservation of color in museum specimens, except for unusual and rare specimens, whenever the supply of fresh material is sufficient for teaching purposes. When the supply of fresh material is scanty, then it is very important to have a good method of color preservation. The Kaiserling method as it is at present requires too great care, too frequent changing and is too expensive. I think it would be of the very greatest advantage to the teaching of pathology if some better and more satisfactory method could be devised.

IX.

From the Department of Pathology and Bacteriology, University of Minnesota. Prof. H. E. Robertson.

1. The method which we use is the common Kaiserling method, practically as described by Kaiserling himself.

2. Our modifications have been (a) the adoption of two tanks of alcohol in place of one, using the first as a dirty, weak alcohol to remove the Kaiserling I, and the second as a clean, strong alcohol to complete the color return. (b) We have also adopted a cabinet for these tanks, which consists of a long box holding four glass tanks. These glass tanks are of the shape of vats, approximately 18×30×8 inches in size, with sloping sides. For the tops of the tanks we use a sheet of rubber with a wooden frame for binding, which lies over the top of the tank. The box is arranged with a lid which raises in such a way as to expose all four tanks. Label holders on this lid keep us in close touch with the specimens as they pass through the solutions.

Dr. Corbett, of the department of surgical pathology, has devised a method of mounting specimens of dry bones in glass boxes with the glass on both sides, in such a way that the bone can be seen in all its aspects.

3. *Color results.*—The hemoglobin of the blood is well preserved, especially in clots. The color of the muscle is preserved but dulled. In bile-stained specimens the biliverdin is preserved. The pulp of liver and kidneys is preserved but dulled.

4. The length of time of preservation of colors varies, for unknown reasons, from six months to two or three years.

5. Light causes specimens to fade more rapidly.

6. Heat destroys color more rapidly than light.

7. Exposure to air apparently does not materially influence.

8. Method of preservation for exhibiting has been described by Dr. F. F. Wesbrook in the *Journal of Infectious Diseases*, Supplement I, May, 1905, page 310, under "Laboratory methods and devices." To this method we have added a small piece of glass rod, ground flat on one side and glued to the jar, for the purpose of supporting the copper wire and preventing it from sliding down with the label. Our flat jars have the label holders soldered to the top.

9. We try to preserve specimens in jars in pairs, one mounted in gelatin, the other in Kaiserling III, for the purpose of handling.

10. To prevent moulds and bacterial infections we have tried camphor in Kaiserling III, and found it useless. An alcohol solution of thymol added to Kaiserling III prevents growth of moulds.

Recently we have adopted a method of adding a small amount of ten per cent. formalin to Kaiserling III, using one-third formalin to two-thirds Kaiserling. This amount apparently does not affect color preservation, and preserves the specimen very satisfactorily.

11. We have used the gelatin method in flat jars, using ten per cent. gelatin in Kaiserling and acidulating with acetic acid. The specimen is kept in contact with the surface of the jar by a glass rod at the back used as a wedge. Some of our specimens liquefy and some do not. Apparently liquefaction follows the breaking of the seal at the top. As yet we have not been able to seal the tops of the jars so uniformly as to prevent absolutely the entrance of air. If the specimen has not been properly fixed blood pigment will diffuse through the gelatin.

12. I am personally convinced that it is well worth while to attempt the preservation of color in museum specimens. The supply of fresh teaching material has never in my experience been sufficient to entirely meet the needs which a colored specimen can supply.

13. We use our colored preparations for teaching purposes, in connection with microscopic study of tissues, and clinical history and autopsy findings of the case, so that the student gets a complete picture of the case as a whole, and at the same time can study the appearance of the specimen macroscopically and microscopically.

14. I am unable to state the cost, for the work is done for us by various laboratory assistants, without the possibility as yet of establishing a definite department for the museum.

We have given three floors to the housing of our museum and library, the museum occupying approximately two floors. Our specimens number about 3,500, and we will probably average about two hundred new specimens each year.

X.

From the Pathological Museum, McGill University, Montreal, Canada. Drs. Maude E. Abbott, Joseph Kaufmann and Mr. E. L. Judah.

1. Kaiserling's solutions, Nos. I, II, and III, are used almost exclusively in our Museum, with excellent results.

2. Glycerine added in equal parts to Kaiserling No. III, helps to restore the color of specimens when these have been left too long in the second solution.

3 and 4. The results, in so far as retaining good colors are concerned, depend entirely on the condition of the color when the specimen was received, the manner in which it is fixed and the amount of color which the specimen has retained after it has gone through the various Kaiserling solutions. A specimen which is put through properly, in our experience, will retain its color well for about ten years. As a rule, however, we find that there is a progressive loss of color after three or four years. The less thoroughly a specimen is fixed the more rapidly will it lose its color. Soft specimens rarely retain their colors very long.

5. Strong light, and especially direct sunlight, always has a deteriorating effect on specimens, particularly those that have naturally bright colors. Specimens kept in the dark in our storage rooms look like fresh when taken out in two or three years' time.

6. Heat has a bad effect on the specimens. They become soft, discharge a great deal, and there is coincidently a considerable loss of color; in short, there seems to be a very gradual process of maceration going on.

7. Exposure to air is always detrimental, especially if the specimens are fresh. The colors fade and the edges of the specimens become dry and translucent.

8. Most of our specimens are mounted on frames in square glass jars, with covers cemented on, obtained from Altmann & Co., Berlin, Germany. The frames are made in the Museum workshop to fit the individual specimen, and in placing it upon the frame great care is taken to preserve the anatomical relations as well as to exhibit the pathological lesion. For economy and for æsthetic reasons full sets of jars in graded sizes to suit the different organs, are kept in stock, so that an unnecessarily large jar is never used for a small specimen. Details of this method of mounting and of making the frames are given in an article (E. L. J.) in the *Journal of the Canadian Medical Association* for 1911.

9. For demonstrating purposes we use (a) sealed specimens, mounted either in Kaiserling No. III, or gelatin, and (b) storage

specimens kept in earthen crocks; these the students are allowed to handle and study.

10. We have very little trouble with moulds or bacterial infections. We add as a routine either a few crystals of thymol or carbolic acid to our solutions (this latter is used in preference to thymol, which leads to opalescence of fluid).

11. The method used by one of us (J. K.) for preparing and using gelatine as a mounting medium is described in the *Journal of Anatomy and Physiology*, Vol. XLIV (Bruère and Kaufmann, "Neutral Tinted Glycerine Jelly as a Medium for the Mounting of Pathological Specimens"). This article is also reprinted in this Bulletin. Our gelatine mounts do not liquefy in the hottest days of our Canadian summers; but specimens of pneumonias of lobar type have not yet been mounted in gelatine by us.

12. Even when the supply of pathological material for teaching purposes is abundant, we consider it worth while preserving color in specimens, as one cannot always get offhand a complete series of specimens demonstrating pathological gradations.

13. Active teaching is done in this Museum, the specimens being used extensively in the following ways:

(i) To illustrate the didactic lectures in pathology and the clinics in medicine and surgery.

(ii) For demonstrations within the Museum. Here large series of specimens illustrating the different stages and phases of disease are shown to groups of ten to fifteen students, the subjects demonstrated covering the range of general pathology for the third year and of special pathology for the final students; practically every specimen of interest is demonstrated to the student at least once in the year.

(iii) Students' Descriptive Exercises. In these a specimen allotted is described in writing by the student and a comparison is drawn with other specimens showing allied or differing conditions. For details see "The Museum in Medical Teaching," *Journal of the American Medical Association,* March 25th, 1905.

14. The cost of keeping in order a large museum collection in which active teaching is being done is considerable. A salaried medical officer is needed in addition to a præparator and osteologist. The fluids need annual inspection.

XI.

From the Biological Laboratory, Department of Agriculture, Ottawa, Canada. DR. CHARLES HIGGINS.

1. Chloral hydrate method preferred. Having had some experience with the Kaiserling method of preserving museum specimens and having been confronted with the fact that with this method one had to exercise great care to remove the specimen at

the right moment from one or other of the solutions, I was forced to conclude that for my particular requirements the method did not lend itself without serious drawbacks to my needs.

The line of least resistance is the natural one for the busy worker in any field to follow, and the laboratory worker is no exception to the rule. Appreciating that the use of a number of solutions would not give the best results in my hands, I searched and experimented for a single solution that would give one a permanent preparation in which the color of the original specimen would not be impaired to any marked extent. The various solutions with which I have experimented only gave me an experience of failure till I came across the solution of chloral hydrate described by L. L. Heidenreich (*Russhii Vratch. St. Petersburg*, No. 16, 1903), as mentioned in an abstract in the *Journal of the American Medical Association* for December 5th, 1903, page 1446.

The solution is made as follows:

The embalming fluid consists of three parts of formaldehyde and two parts of methyl alcohol, called Holzin. Seven per cent. of this holzin solution is added to two parts of glycerine and one part of distilled water. To this add from 10 to 20 per cent. of chloral hydrate.

2. Of the method itself I have no personal modification to offer. I use the 10 per cent. solution of chloral hydrate, as an increased strength is found to shrink some of the tissues, although I am of the opinion that for special work and tissues some modification could be introduced to advantage.

In the manipulation of the specimen it may be of interest to mention my method of dealing with a specimen after its receipt at the laboratory. The majority of my specimens are large, consisting of the tissues received from horses, cattle, sheep, hogs, dogs and other animals. The specimens being large, the question of containers during the hardening process is an important one. I use a very simply constructed tank as follows: a length of ordinary glazed sewer tile two feet in diameter was placed on a thick piece of wrapping paper on the cement floor of my specimen room. To a proper amount of cement and sand water was added, the whole thoroughly mixed, and the bottom of the tile filled to a depth of about three inches. In this cement mixture, while it was still soft, a number of pieces of iron pipe were placed for reinforcement. The whole was allowed to harden and a thin paste of pure cement was made and poured over that already in place to fill any of the small interstices which the first treatment had not filled and the cracks which had formed through the shrinking of the cement on drying. In two days after this treatment the tile was ready for a preserving vat. With a galvanized-iron cover the whole was complete.

On the arrival of a specimen deemed worthy of preservation, I desire to place the whole mass of tissue in the solution and to cut this, after it has properly hardened, in the manner best suited to show the specimen in the jar which is to be its final resting place. The solution mentioned above is the only one that is used, and the length of time it remains in the solution makes no material difference in the final results.

3. The color preservation is the most nearly perfect, considering the amount of time spent on a given specimen, that I have ever obtained, even when working some of the more complicated methods with the utmost care. The color remains very nearly normal excepting in those cases where there is an abnormal amount of blood in the tissue, when it will become somewhat darker. I prefer tissues that have come from animals that have been bled, for we then have less blood to deal with. When it is impossible to get the tissue in this condition, the placing of the whole in running cold water for twelve to twenty-four hours will generally brighten up the color, and the tissue can then be placed in the preserving fluid with the hope of having very good results as regards color preservation.

4 and 5. The length of time which the specimen will retain its color varies greatly according to the exposure to light. I have one specimen that has been preserved for four years and is still in first-class condition. It is a portion of the lung and the heart of a rabbit. The arteries of the heart are very bright red and stand out on the paler muscular tissue. Another specimen, the ileocaecal valve and portion of the caecum from an acute case of hog cholera, shows the petechial haemorrhages very distinctly and has been in the fluid for over a year. During five weeks this specimen was in the bright sun continuously.

6. I have not observed that the temperature has any very great effect on specimens preserved by this method, although I would not intentionally submit any preserved specimen to unnecessary heat. During the summer months they may reach a temperature of 90° F. and in the winter they may be cooled to the freezing point.

7. After preservation the specimens will withstand exposure to the air for days without showing serious deterioration.

8. I prefer the oval type of museum jar with the flange at the bottom to secure rigidity and the flange at the top which will allow the secure sealing through the large amount of surface presented on this flange. I use a preparation for sealing which was supplied with the jars and apparently consists of asphalt and rubber. The only objection to it is that it is very slightly soluble in alcohol.

9. Such specimens as are used for demonstration purposes are kept in the sealed jars.

10. Bacterial infections and moulds do not affect my preserved specimens or the solution used.

11. I have had very little experience with the jelly or gelatine methods of preservation.

14. The cost of the solution which I use is its only drawback. Considering the results and small amount of labor required in looking after them I do not consider it to be excessive. As a means of reducing the cost to the minimum I have a vat of used solution for hardening the specimens prior to their cutting and placing in the jars. When they are cut they are freely washed in warm running water, placed in the jars and then perfectly fresh, clean preserving fluid is used to fill the jar, after which the top is sealed on. To the old solution it is necessary to add the alcohol and formaldehyde solution, and it may be advisable to add some chloral hydrate. I have not added the chloral hydrate, believing that when this step is necessary the solution should be thrown out.

For the laboratory worker who is obliged to look after his own specimens there is no other method with which I am familiar that can be used with successful results. Specimens hardened by this method can subsequently be used for microscopic preparations and I have not observed that there is serious deterioration in the degree with which they take up nuclear stains.

XII.

From the Laboratories of Pathology and Bacteriology of the Medico-Chirurgical College of Philadelphia. PROF. JOSEPH McFARLAND AND DR. E. A. CASE.

1 and 2. Kaiserling's solution with paraffin oil preferred. The most useful method for preserving the natural color in museum specimens has been, in our experience, the well known one of fixing in Kaiserling No. I, placing in 80 per cent., then 95 per cent. alcohol and then passing to the glycerine potassium acetate and water solution of Kaiserling. From here they receive a bath in glycerine for a variable length of time (24-48 hours, or 72 hours) depending upon their size, and finally are put into neutral paraffin oil. We sometimes use the Kaiserling method alone, and with some specimens it works very satisfactorily, but with most of them the fluid becomes cloudy after a short time.

3. In paraffin-oil specimens the general contrasts are well preserved, though of course the very fine destinction seen at autopsy is to a great extent lost. For example, we have never been able to retain the beautiful contrast seen in nutmeg liver. The dark red color of the blood seems to be lost in some areas and faded in others, though our results have, on the whole, been reasonably satisfactory. The more delicate shades of red and yellow are not preserved as perfectly as one would like, but we feel that the results are quite good.

4. Our oil specimens are from six months to two years old and

in them we have noticed no deterioration. Some of the few Kaiserling specimens we still keep are three and four years old and show the colors very well.

5. The museum in which our specimens are kept receives very subdued daylight, electricity being used when the room is in use. For demonstrations the specimens are placed in the laboratory, being returned to their places at the close of same. During the preparation of specimens they are kept in a rather dark room. We have not been bothered as yet with any deleterious influence light may have.

6. Have never observed any change due to heat.

7. All of our permanent specimens are in sealed jars.

8. Depends upon the character of the specimen. Long specimens like intestine or aorta we prefer in tall, round jars. Hearts and a few other organs look well in round jars. Most specimens, however, are shown to the best advantage in the rectangular jar with a flat lid. Our great difficulty has been in getting a substance which will thoroughly seal the jar and prevent the leaking of the oil which soils the outside of the jar and the label. We have used glue and one of the "china-mending cements," but neither is very successful. Other methods used by our friends have proven just as unsuccessful.

9. The specimens used for demonstrations are fixed and mounted as described, being permanent ones. We have stands arranged upon the tables in the laboratory of morbid histology, upon which the specimens are placed. This brings the jar about the level of the student's shoulder. Beneath each specimen is a descriptive label, and on the table below a microscopic slide and illustrated chart with legends explaining them. The student is thus enabled to see the morbid anatomy and morbid histology of the condition he is studying. Demonstrators are present to assist him. He gets this work in connection with his lectures on special pathology given in the third year. In the second year the specimens are used to demonstrate the morbid anatomy of the microscopical conditions he studies in his course on morbid histology, the method being somewhat different, a demonstrator pointing out the detail of the few specimens he would see at each period.

10. No trouble from moulds is experienced with oil specimens. With Kaiserling specimens a few crystals of thymol in the jar will prevent the growth of these organisms.

11. We do not use the gelatine method.

12. We have never reached the Utopian existence intimated in this question. Our supply of fresh specimens, while fairly good, is not good enough to justify our not fixing and preserving all useful specimens.

13. We have no suggestion other than the methods we use, briefly described under Question 9, methods undoubtedly used by most other laboratories.

14. To figure the exact cost of our museum per year is rather difficult, as its expenses are included with those of the entire department. Our chief expense is glassware and reagents. Reagents may be used more than once in the preparation of specimens, thus reducing expense. After the specimens are sealed, labeled and classified the only care they require is cleansing of the outside of the jars, resealing those that become loosened and changing discolored Kaiserling or formalin specimens. If oil specimens are carefully prepared and handled they do not need to have the fluid renewed.

This is a rather difficult question to answer intelligently as we have the museum care in connection with other work and do not keep account of the amount of time devoted to it. A large and growing museum takes considerable care and time.

XIII.

From the Pathological Laboratory of the University of Pennsylvania. PROF. R. M. PEARCE AND B. S. VEEDER.

1. We find the best color preservative to be paraffin oil following the use of Kaiserling solution, although it presents several difficulties as mentioned below.

4. We have several specimens preserved in oil which have retained their color several years.

5. There is a gradual loss of color when exposed to the light.

8. We use a rectangular jar, as a rule, as the circular jar distorts the appearance. Extreme care in cleaning the jar we find to be of importance. The method of sealing the jar has given us more trouble than any other one factor. We have tried numerous resins, glues and cements, but have as yet been unable to find any method which prevents the oil from loosening the lid. In permanent mounts with the Kaiserling solution we have not had this difficulty. Several of the mounted specimens are very satisfactory, but we find the color is not preserved as well as in oil.

9. For demonstration purposes we use largely fresh material, either as autopsy or by the case system. We are able to keep fresh specimens in very good condition for a week or ten days with an ammonia refrigerating plant, at a temperature of from 32° to 33° C. Specimens at the end of this time, after they have been used for teaching purposes (three or four demonstrations) are no longer suitable for permanent preservation. We also, in addition to mounting unusual specimens for museum purposes, preserve in large crocks typical lesions, which have been run through Kaiserling solution, for the purpose of replenishing the tables when by chance we are unable to obtain fresh material, or when we wish to give a systematic demonstration upon some one sys-

tem. We add formaldeyhyde to the Number IV Kaiserling for this purpose; the surface at times becomes somewhat injured by the formaldehyde, but a fresh surface gives a very good color result.

10. We have had some trouble with moulds and bacterial infections. We have used thymol without success to overcome this.

11. Very unsatisfactory.

12. Although, as mentioned above, we teach mainly from fresh material we find it at times best to give a demonstration upon some one subject, such as, for instance, kidney lesions, and the various stages and types of nephritis. For this purpose we find it necessary to keep on hand stock specimens preserved with color.

13. From time to time we take specimens of particularly interesting autopsies and that are particularly suitable for teaching purposes, and preserve them as a set in separate jars by the method noted above, so that at a future time we are able to have a complete case of autopsy material for use at any one time; for instance, we will preserve one lung, one kidney, half of the spleen, half of the liver, etc., by means of Kaiserling and use the other half for fresh material for teaching purposes at the time they are received.

XIV.

From the Royal Victoria Hospital, Montreal, Canada. DR. OSKAR GRUNER, *Pathologist.*

1. Kaiserling method employed.

2. Omit salts from Kaiserling's solution No. CXI.

3. Good preservation of colors is maintained for at least two years.

4. Such color preparations can be kept without deterioration for four or more years.

5. The effects of light are deleterious, and therefore roller blinds should be supplied for museum cases.

6 and 7. Effects of heat and exposure to air unknown.

8. Specimens may be put up for exhibition most conveniently in flat jars sealed with Stockholm tar and lead oxide.

9. Specimens used for demonstration purposes are kept in tanks, in a solution of one part glycerine to three parts water.

10. Moulds and bacterial infections are endemic in some museum preparation rooms, unknown in others.

11. Liquefaction of gelatine by certain types of specimens is practically unavoidable.

12. Yes, it is worth while to attempt the preservation of color in museum specimens, even when the supply of fresh material is sufficient for teaching purposes.

XV.

From the Cooper Medical College Museum, San Francisco, California. Prof. W. Ophuls.

1. We use the Kaiserling method practically unmodified.

2. The advantages and disadvantages of this method I believe to be fairly generally known. I have not been able to find a modification which is much of an improvement on the original method.

3. The results depend more on the condition of the material and on an intelligent application of the method to it. The method is most unsatisfactory in tissues stained with bile or otherwise heavily pigmented (spleen in acute malaria, etc.).

4. The specimens keep fairly well in a dark, cool place.

8. We use the ordinary square jars. We have not been able to find a satisfactory material for sealing the jars.

10. We have had very little trouble with moulds and bacterial infections.

11. Gelatine mounts seem to keep best when covered with a thin layer of paraffin or similar material.

12. I believe that a collection of standard or stock preparations is very helpful for teaching purposes, even though the fresh material may be ample.

XVI.

From the University of Toronto. Professor J. J. Mackenzie.

1. We use W. H. Watters' gelatine modification of the Kaiserling method.

2. None.

3. The personal experience of an intelligent museum servant is the best guide to the special preservation of color in special tissues.

4. Certainly remain unchanged for five years. Have an infarct of the kidney, 8 years old, which is still serviceable.

5. We do not protect from light; they are in an exceedingly well lighted museum, but do not get direct sunlight.

6. No experience.

7. Are not exposed to air.

8. Rectangular jars, without foot, and with plain top.

Sealing. We now use: Black rosin, 5 parts; yellow wax, 1 part; melted together; and then stir in one part of red ochre or Venetian red, well dried and in form of fine powder. This is a very satisfactory seal. It is melted before use, and the glass warmed.

9. For demonstration purposes use screw-topped jars.

10. Use formalin to prevent moulds. Still sometimes have them.

11. Have been unable to prevent liquefaction, and color is not as good as in Kaiserling III.

12. Certainly.

Department of Exchanges.

One of the chief objects of this Association is the development of an international system of museum specimens and pathological material. This Exchange is conducted by means of circular letters, the enquiry being sent out from time to time to the members by the Secretary, requesting a statement of material needed and of specimens offered in exchange. The announcements received in respect to this enquiry are published in the next Bulletin, or may be made in the intervals of publication of the Bulletin by means of a printed circular. As a result of the last announcement, made in Bulletin No. 2, a number of important exchanges were transacted, the institutions participating being the Army Medical Museum, Washington, D. C., Major F. F. Russel; the Pathological Institute of the University of Denmark, Copenhagen, Prof. Johannes Fibiger; the University of Geneva, Switzerland, Prof. M. Askanazy; the Federal Plague Laboratory, San Francisco, Surgeon G. W. McCoy; the Pathological Department of the State University, of Iowa, Prof. Henry Albert; the Pathological Department of the University of Christiania, Norway, Prof. Francis Harbitz; the Pathological Museum of McGill University, Montreal, Prof. J. G. Adami; the Liverpool School of Tropical Medicine, Dr. H. B. Newham.

The following are the conditions of Exchange:

(1.) The cost of transportation is in all cases to be paid by the institution receiving the material transported.

(2.) The exchange may be transacted either through the Secretary or directly between the giver and the recipient. Before any material is sent to any applicant he must be notified of the intention of the proposed donor, in case his request has already been granted by some other member of the Association. After a specimen has been received the Secretary must be notified at once by the recipient that the request has been granted, in order to avoid a repetition of the request in the next Bulletin.

(3.) If the specimens are very small, they may be sent by post. Large specimens should be transported, not in individual glass jars, but in bulk, wrapped in moist wool or cheesecloth, and packed in soldered tin or other water-tight receptacle.

(4.) Each specimen should be tagged with its reference number.

(5.) The nature of the specimen and, where possible, a brief history of the case, should be forwarded to the recipient.

If the material offered in exchange by the recipient of a given specimens is not such as is needed by the donor, the latter is requested to communicate his need to the Secretary, who will make a special effort to obtain, through correspondence as well as through the columns of the Bulletin, his particular need.

EXCHANGES PROPOSED.

Name and address.	*Material wanted.*	*Offered in exchange.*
Prof. Henry Albert, The State University of Iowa, Iowa City.	Specimens of primary typhlitis. Fibroid heart.	
Dr. Artman Bruere, Royal Victoria Hospital, Montreal.	Bilharzia Hematobia, Ova of	
Dr. Gordon Byers, McGill University, Montreal, Can.	Eyeballs showing any and every kind of pathological condition.	
Prof. H. Chiari, Strassburg, Germany.		Actinomycosis hepatis hominis. Pelvis showing right sided ankylosis between the lumbar and sacral vertebrae.
Dr. Fraser Gurd, Tulane University of Louisiana, New Orleans, La.	Infarction of heart. Thrombosis of coronaries. Bronchiectasis. Active tertiary syphilitic lesions. Specimens of unusual tumors. Blastomycosis.	Microscopic slides and tissue for microscopic examination from cases of leprosy, rhabdomyoma, endothelioma of the dura, xanthoma tuberosa, carotid tumor, mixed tumor of branchial clefts, strongyloides intestinalis in the tissues.
Dr. R. de Josselin de Jong, West-Zeedijk 122, Rotterdam, Holland.	Spleens from morbus Banti, kala-azar, granuloma.	Cirrhosis, different varieties.
Prof. Marie and Prof. Gustav Roussy, Faculté de Médécine de Paris.	Hemorrhagies; Ramollissements; Lacunes; Etat vermoulu du cerveau; Lacunes de la protuberance; Ramollissements du cervelet; Moelles de tabes; Poumons avec lesions seniles; Infarctus du myocarde; Atherome aortique trés prononcé; Rachis dans le mal de Pott (coupes sagittales au Kaiserling); Perisplenite des vieillards.	
Prof. W. Ophuls, Cooper Medical College Museum, San Francisco, Cal.	Material from scarlatinal nephritis (both of the acute interstitial nephritis and of the glomerulonephritis).	Coccidioidal granuloma.

Name and address.	*Material wanted.*	*Offered in exchange.*
Dr. Thomas Ordway, Bender Hygienic Laboratory, Albany, N. Y.	Lesions of the intestinal tract in typhoid and the various dysenteries; also any gross pathological specimens illustrating typical lesions in nonsurgical diseases. Slides of trypanasomiasis.	Primary splenomegaly and Banti's disease.
Dr. Lawrence J. Rhea, Montreal Genl. Hos., Montreal, Canada.	Tissue from the liver in cases of congenital obliteration of the bile ducts.	Tissues from generalized blastomycosis of the lung fixed in Zenker's fluid for microscopic examination.
Dr. Victor Scheel, Kommunehospital, Copenhagen, Den'k.	Hanot's cirrhosis.	
Prof. J. L. Todd, McGill University, Montreal, Can.	Kala azar; all material both gross and microscopical. Slides of *Aleppo Boil.* Slaty spleen in malaria: microscopic slides showing thrombosis of capillaries, brain or other organs by malarial parasites. Slides of smallpox and vaccine bodies. Slides of Negri bodies of rabies. Slides of Trachoma bodies. Balantidium coli. Adult worn of Taenia Echinococcus. Paragonium Westermanii. All material from Bilharzia haematobia. All material from Schistosomum cattoi. Slide and muscle of Trichina spiralis. Adult worm of filaria loa. Adult worm of bancrofti. Adult worm of perstans. Adult worm and larvæ of F. volvulus. Strongyloides. Porocephalus. Thrombidia. Conorhinus sanguisuga. All ticks and biting insects important as parasites in North America.	Glossina palpalis, (Tsetse flies). Ornithodoros moubata (human ticks).
Dr. W. F. Whitney, Warren Anatomical Museum, Boston, Mass.	Lung in tuberculosis or any duplicates of special interest.	Tumors.

Name and address.	*Material wanted.*	*Offered in exchange.*
Prof. J. G. Adami, McGill University, Montreal, Can.	Hodgkin's disease. Monstrosities. Parasites, especially tropical.	
Prof. Ludwig Aschoff, Freiburg, i.B, Ger.		Syphilitic aortitis, tumors of the thyroid, rickets and tuberculosis of organs.
Prof. B. Fischer, Senckenbergisches Institute, Frankfurt a. M., Germany.	Anatomical specimens of malarial diseases, plague, smallpox, Bilharzia of the bladder.	**Aneurysms of the aorta,** all forms of endocarditis, diseases of the kidney.
Dr. O. C. Gruner, The Royal Victoria Hospital, Montreal.	Spleens and lymph glands: all unusual conditions especially leucaemia, Hodgkin's and sarcoma.	

The Pathological Society of Great Britain and Ireland has issued, by means of a circular, the following list of material wanted. This list is republished here, with the permission of the Society, and the Society will have pleasure in forwarding the material requested.

Material wanted.	*Method of preservation.*	*Wanted by.*
Parathyroids and piece of thyroid from cases of haemophilia and cases of delayed union of fractures.	Formalin.	J. S. O. Douglas, University, Great Charles St., Birmingham.
Any lumps in the uterus of rabbits except normal pregnancies.	Formalin.	A. E. Boycott, Guy's Hospital, London, S. E.
Melanotic sarcoma or carcinoma (for histology class).	Formalin.	A. E. Boycott, Guy's Hospital, London, S. E.
Areas of cerebral softening from cases of hemiplegia, etc. (a sufficient quantity of the tissue for chemical analysis).	Formalin.	Prof. J. Lorrain Smith, University, Manchester.
Brain and cord from cases of locomotor ataxia, for chemical and histological analysis.	Formalin.	Prof. J. Lorrain Smith, University, Manchester.

REPORT

OF THE

Third Meeting of the International Association of Medical Museums

HELD IN THE

NEW WILLARD HOTEL, WASHINGTON, D. C.,

May 3d and 4th, 1910.

The meeting was called to order by the President, Prof. W. G. MacCallum. There were present: Prof. A. S. Warthin, University of Michigan; Prof. Souchon and Dr. Fraser Gurd, of Tulane University, New Orleans, La.; Dr. Mandlebaum and Dr. Libman, Mount Sinai Hospital, New York, N. Y.; Prof. F. J. Shepherd, Prof. J. G. Adami, Prof. S. B. Wolbach, Prof. J. L. Todd and Dr. Maude E. Abbott, of McGill University; Prof. Leo. Loeb, University of Pennsylvania; Prof. J. J. MacKenzie, Toronto, Canada; Prof. Guthrie McConnell, St. Louis, Mo.; Dr. D. S. Lamb, Army Medical Museum, Washington, D. C.; Dr. Harvey Gaylord, Buffalo, N. Y.; Prof. O. Klotz, University of Pittsburg; Prof. Claribel Cone, of Baltimore, Md.; Dr. Wilson, of Rochester, Minn.; Passed-Assistant Surgeon Edward Francis, U. S. Public Health and Marine Hospital Service; Dr. F. A. Lambert, College of Physicians and Surgeons, New York, N. Y.; and others.

TRANSACTION OF BUSINESS.

The minutes of the last meeting, held at Washington, D. C., on October 1st and 2d, 1908, were read and confirmed.

The Secretary reported that the proposed amendment to Article II, of the Constitution, Membership, of which notice of motion was given in the circular letter of April 12th last, was not approved by the Executive Committee, and was therefore not brought before the meeting.

The following amendment to Article IV, of the Constitution, was placed before the meeting with the recommendation of the Executive Committee, and passed. Moved by Prof. MacCallum, seconded by Prof. Warthin: "That for the more active transaction of business, and in order to promote the local interests of the Association at different centers, the Executive Committee be enlarged by an increase in the number of Councillors, of whom there shall be seven instead of two, and by the appointment of an Assistant Secretary."

The following persons having signified their wish to join the Association were elected to active membership: Prof. Carl Lundborg, Stockholm, Sweden; Dr. Arthur Keith, Royal College of Surgeons, England; Dr. J. W. W. Stephens, Liverpool School of Tropical Medicine, England; Prof. Leo Loeb, University of Pennsylvania; Dr. Martha Wollstein, Rockefeller Institute, New York, N. Y.; Dr. Thomas Ordway, Bender Hygienic Laboratory, Albany, N. Y.; Dr. G. H. Whipple, Johns Hopkins Hospital; Dr. B. C. Crowell, Bellevue Hospital Medical School, New York, N. Y.; Dr. G. H. Hewitt, Georgia State Sanitarium; Prof. H. S. Birkett, Dr. W. W. Chipman, Dr. W. W. Francis, and Dr. Joseph Kaufmann, McGill University, Montreal, Canada; Dr. Edward Francis, Assistant Director Hygienic Laboratory, U. S. Public Health and Marine Hospital Service; Dr. R. A. Staig, Glasgow University, Scotland; Dr. Fraser B. Gurd, New Orleans, La.; Dr. R. P. Strong, Bureau of Science, Manila, P. I.; Prof. Collins Warren, and Dr. Lawrence Rhea, Harvard Medical School; Dr. L. B. Wilson, Rochester, Minn.; Dr. F. S. Mandlebaum, Mount Sinai Hospital, New York, N. Y.; Dr. R. A. Lambert, College of Physicians and Surgeons, New York, N. Y.; Dr. W. G. Gallie, University of Toronto; Dr. C. F. Craig, Army Medical Museum, Washington, D. C.

In addition to the above mentioned new members elected at this meeting the Secretary reported that the following gentlemen, who had signified their wish to join the Association, had been elected in the interim of the meetings (Feb. 12th, 1910), by the written vote of the Association: Prof. H. Chiari, Strassburg, Germany; Prof. P. Courmont, Lyon, France; Dr. O. de Cruz, Rio de Janeiro, Brazil; Prof. M. T. K. A. Forssman, Lund, Sweden; Prof. G. Herxheimer, Wiesbaden, Germany; Prof. Z. Jores, Coln-Lindenthal, Germany; Prof. J. de Jong, Leyden, Holland; Prof. R. Kretz, Prague, Austria; Prof. T. G. Lee, University of Minnesota; Prof. D. Lubarsch, Dusseldorf, Germany; Prof P. Marie, Paris, France; Prof. G. Martinotti, Bologna, Italy; Prof. E. S. Popham, Manitoba Medical College, Canada; Prof. Ulrik Quesnel, Upsala, Sweden; Prof. G. Roussy, Paris, France; Dr. V. Scheel, Copenhagen, Denmark; Prof. O. Stoerck, Vienna, Austria; Dr. Wolferstan Thomas, North Brazil; Dr. J. L. Todd, McGill University, Montreal; Dr. S. B. Wolbach, Montreal General Hospital; Dr. G. Byers, McGill University, Montreal.

The following officers were elected:

President: Prof. A. S. Warthin, University of Michigan.

First Vice President: Prof. G. Sims Woodhead, Cambridge, Eng.

Second Vice President: Prof. Edmond Souchon, Tulane University, New Orleans, La.

Third Vice-President: Prof. J. Ludwig Aschoff, Freiburg, Germany.

Councillors: Prof. W. G. MacCallum, College of Physicians and Surgeons, New York; Dr. D. S. Lamb, Army Medical Museum, Washington, D. C.; Prof. E. R. Le Count, University of Chicago, Ill.; Prof. F. F. Wesbrook, University of Minnesota; Prof. P. G. Woolley, University of Cincinnati; Prof. W. Ophuls, San Francisco, Cal.; Dr. George Whipple, Baltimore, Md.

Secretary-Treasurer: Dr. Maude E. Abbott, McGill University, Montreal.

Assistant Secretary: Dr. W. W. Francis, McGill University, Montreal.

Editorial Board: Prof. J. Ludwig Aschoff; Prof. J. G. Adami, McGill University, Montreal, Canada; Major F. F. Russell, Army Medical Museum, Washington, D. C.; Prof. W. G. MacCallum.

The Treasurer's report was submitted, and was audited as correct. Since the organization of the Association, in 1906, the amount received in admission and annual dues, and the interest on the deposit of these had amounted to $228.84. The amount expended on international postage, stationery, the publication of Bulletins Nos. 1 and 2, and programmes for this meeting, to May 1st, 1910, was $122.27, leaving a balance to the credit of the Association in the Savings Bank Department of the Bank of British North America, Montreal, Canada, of $106.57. It was decided that the expenses of the Secretary-Treasurer from Montreal to Washington for this meeting be paid, and that the balance of this money shall be expended on postage and the publication of Bulletin No. 3, in the preparation of which no pains or expense shall be spared, in order to make it an improvement upon the last issue.

The following programme was carried out:

DISCUSSIONS.

1. "*On the advisability of establishing a European section,*" was introduced by *Prof. J. G. Adami, Montreal, Canada,* who said that the remarkably keen interest that had been shown by foreign pathologists in the organization of the Association showed that it met a recognized need abroad. Steps should be taken at once, however, to facilitate the development of the Association in Europe. It is impossible for European members to attend meetings in America except occasionally. In order to organize the Association efficiently in Europe a local Assistant Secretary should be appointed, and local meetings of the Association should be arranged in connection with the International Congresses held in the different centers of Europe.

In view of the fact that a very active response had been received from abroad to the invitation to join the Association that had been circulated by the Secretary, and that much interest in and appreciation of the aims of the Association had been expressed by many of the leading pathologists throughout Europe, who are now members, and as it is impossible for members abroad to attend regularly the local meetings here, it was moved by Prof. Adami, seconded by Prof. Klotz, and carried: "*That this Association favors the establishment of a European section, whose members shall be empowered to take the necessary steps to unite themselves for this purpose, to hold meetings, whether annually or triennially, and to contribute papers, and, if necessary, arrange for the publication of the same.*"

Dr. Warthin considered this a very important motion.

On the motion of Prof. W. G. MacCallum, seconded by Dr. Harvey Gaylord, the Secretary was empowered to write to Prof. J. Ludwig Aschoff, Freiburg, Germany, asking him to undertake the management of such a European section and to arrange for the appointment of an Assistant Secretary resident in Europe, who shall enter into correspondence with the Secretary-Treasurer, and thus transact the necessary business.

2. "*On the Classification of Museum Specimens*," was led by *Dr. R. D. Maddox, of Cleveland, Ohio,* who spoke as follows: The subject of Museum classification is not one to be entered into lightly. Although apparently concerning the curators and teachers of pathology, it indirectly concerns the entire medical profession. To a certain extent it will affect the anatomical and pathological nomenclature, and specimens used as illustrations in textbooks would naturally be reproduced and named by their appended labels. This classification will have a direct influence on Museum expenditures. Each Museum must determine its exact aim and the classification must be sufficiently elastic to permit each Museum to have a certain scope within its particular field.

Museums in general will gain because a classification means good catalogues, good shelf arrangement and exact terminology.

Series of various specimens might be worked up and presented more easily and a more or less complete collection will result. To do all this, a classification must classify broadly or closely as is desired; anatomically it must be practically finished, because pathologically it can never be so. It must be founded upon a system so simple that the Museum will be of value to the untrained visitor who may have an occasion to use it and who is not familiar with the idea of the system, or who will not trouble to learn it. The exact identification of each specimen should not depend entirely on the classification, because it may be necessary to change the classification in minor details, while the identity of the specimens will never change. That is, the specimen should bear an additional entry number as well as its catalogue number.

The use of a classification will involve a considerable increase in Museum expenditure. The increase of expense will be due to the increased space required in shelving or otherwise displaying specimens, because large specimens will necessarily be placed next to small ones and the distance between the shelves will be greater than where specimens are roughly divided into their various kinds, and jars nearly the same size placed side by side.

Dr. Maude E. Abbott described the decimal system of classification which had been in use in the Pathological Museum of McGill since 1899, and which was based on an adaptation of the Dewey decimal system of library classification suggested by Prof. Wyatt Johnson.*

3. *" On methods of preservation of specimens in which natural colors have been retained. Effects of light, heat, etc., on these,"* was led by *Prof. A. S. Warthin of the University of Michigan,* who considered that the subject before the meeting was one upon which much technical information could be obtained from the different members of the Association by eliciting their individual experience. He suggested that a circular letter should be sent to the members asking for an expression of their experience upon the various points under discussion. This suggestion was heartily endorsed by several members present, and, as a result of this discussion, the Secretary was instructed to send around circular letters enquiring the individual experience of members in the effects of light, heat, etc., upon the colors of specimens, the liquefaction of gelatin by certain types of specimens, and other points of personal experience; the replies to these enquiries as well as the lists of specimens for exchange to be published in the Bulletin, which will thus become a manual of the greatest interest to Museum workers.

Prof. Warthin enquired into the experience of members present as to the *liquefaction of gelatin* occurring in certain cases. *Dr. Rhea,* of Boston, replied. (See page 18 of this Bulletin.)

PAPERS.

1. *Further remarks on the preservation of Anatomical specimens with natural colors. Illustrative specimens on view.* By PROF. EDMOND SOUCHON, Tulane University, New Orleans, La. Discussed by Profs. W. G. MacCallum and F. J. Shepherd.

2. *Note on methods of preparing permanent specimens of the anatomy of the middle ear and accessory sinuses of the nose. Illustrated by specimens.* DR. HAMILTON WHITE, Montreal. Discussed by Prof. F. J. Shepherd, published in full in Bulletin. See p. 19.

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*This classification is published in *American Medicine,* April, 1903, and will be republished shortly with the Pathological portion revised.

3. *Note on the preparation of specimens of miliary aneurysms of the cerebral arteries by the Schüttel method.* DR. LUDWIG PICK, Berlin, Germany. Presented by the President.

Prof. Pick reported his ability to demonstrate so-called miliary aneurysms of cerebral arteries by a shaking process in a large percentage of cases. The vessels prepared in this way from eleven cases of fatal cerebral apoplexies were presented by him at the Berliner Medizinischen Gesellschaft on January 4th, 1910, in the course of an address upon "*So-called Miliary Aneurysms of the Cerebral Vessels.*" In each case he carefully removed the gross superficial clot by washing and then gradually removed the vessel leading to the haemorrhagic area, taking with it small portions of the blood-stained brain, the pia mater and even pieces of the choroid plexus. Without further washing the vessel and appended tissues are placed in a large flask containing physiological saline solution, the flask is corked with a rubber stopper and is placed in the shake-apparatus, where it is slowly shaken for from eight to ten hours. At the end of that time the blood-stained saline is drained off, the vessel and its branches are carefully removed and rinsed in saline. Miliary aneurysms, if present, are easily seen on account of their brownish color, which shows up against the clear bloodless vessels. Subsequently the entire vascular tree is put through Karlsbad salt and formalin to preserve its natural color, or is placed in a solution of formalin for microscopic sectioning. Miliary aneurysms were demonstrated in this way in nine of the eleven cases; in eight of these he was able to demonstrate to the clinician the source of the fatal bleeding, in five cases by simple macroscopic examination, and in three by the aid of the microscope. He also found miliary aneurysms in four non-apoplectic cases, two were cases of atherosclerosis of the cerebral vessels, and two cases of senile cephalomalacia.

The advantages of this shaking method over the older maceration or teasing methods of examining the cerebral vessels are (1) the rapidity of the process by which the vascular tree is freed from the adjacent structures for early examination, and (2) the greater delicacy of the method, the vessel walls being less liable to be broken and artificial ruptures created.

4. *On the value of public Medical Museums, and on the possibility of establishing such a Museum in each of the larger cities.* PROF. W. G. MACCALLUM, *College of Physicians and Surgeons, New York.* The remarks made by Prof. MacCallum are published editorially in this Bulletin.

The paper was discussed by Dr. D. S. Lamb, who said that the experience in the Army Medical Museum, which might be looked upon as a public Museum, was instructive in this connection. Great interest is taken in the collections by the public, and there is no doubt that they get most useful information from their constant visits there. Dr. Lamb wished to testify to the fruitful results of one public medical museum.

Professor A. S. Warthin was much in sympathy with Prof. MacCallum's remarks. At Ann Arbor the Medical School has been planning to convert the old Museum into a State Museum of Hygiene, which would be especially arranged for public use. He remarked on the interest that was shown by the public in the little anatomical museums seen at all German fairs. It was true that this type of collection pandered to morbid instincts among the people, but if such shows could be replaced by the establishment of municipal museums of preventive medicine much good might be done by directing this interest into useful channels. In any movement of this kind much coöperation could be obtained from the Associations for the Prevention of Tuberculosis. Germany is far ahead in these matters.

Prof. F. F. Wesbrook, University of Minnesota, said that much had already been done in this direction in Wisconsin. Action had been begun by traveling exhibits of tuberculosis. To these had gradually been added material on carcinoma, typhoid and diphtheria, so that a good general traveling museum will soon be available there. He hoped that this organization would do all it could to stimulate public interest in the prevention of disease.

Prof. Oskar Klotz thought Prof. MacCallum's suggestion very apropos that the public deserved some enlightenment upon diseases in which they themselves were interested. The present work being done on serums, for instance, and on immunity in general, would be of immense interest to the public. The establishment of such public museums should be in the hands of those who will and can instruct the public, that is, the city should act in coöperation with the university in this matter.

The discussion was closed by Dr. MacCallum, who said that the individual members of the Association should endeavor to initiate the organization of such public medical museums in their respective centers and of itinerant museums for smaller places. This may be looked upon as a part of University Extension work, and would be of great value in the sphere of preventive medicine.

5. *On the Teaching of Pathology by Kaiserling specimens.* Dr. Guthrie McConnell, *St. Louis, Mo.*

6. *On the Teaching of Pathology by the case system. Supplemented by gross and microscopic specimens.* Dr. Thomas Ordway, *Bender Hygienic Laboratory, Albany, N. Y.* Published in this Bulletin. Discussed by Dr. S. B. Wolbach. See p. 4.

7. *On the teaching value of enlargements of microphotographs.* PROF. A. S. WARTHIN, *Ann Arbor, Mich.*

The usefulness of the Museum of the University of Michigan had been greatly increased by means of the enlargement of microphotographs taken from series of specimens of tuberculosis, typhoid and other diseases. This method of objective teaching was given a trial during the past session and the students had shown much interest, having of their own accord come in and studied the series freely.

Prof. W. G. MacCallum remarked that the ordinary illustrations of text-books which were available to students were exceptionally poor. He had noticed this particularly in the use of ordinary pictures with the epidiascope. Photographs would be excellent.

9. *On the value of Lumière polychrome photographs for demonstration and reproduction purposes.* DR. HARVEY R. GAYLORD, *New York State Cancer Laboratory, Buffalo, N. Y.* (For a description of this method see the *Journal of Medical Research.*)

10. *Demonstration of specimens illustrating the preservation of the results of research as material for medical museums.*

(a) Specimens showing experimental work on the production of the normal placenta. PROF. LEO LOEB, University of Pennsylvania.

(1) Incisions into the uterine wall made six days after ovulation caused within ten days the development of multiple tumor-like nodes consisting of maternal placenta, notwithstanding the fact that a ligation of the Fallopian tubes precluded the possibility of an ovum reaching the uterine cavity.

(2) The same procedure was employed as in specimen No. 1, but the ovaries or corpora lutea were removed soon after ovulation, no reaction taking place but ordinary wound healing.

(3) Instead of incising the uterus, introduction of a foreign body into the uterine cavity (6 days after ovulation) will call forth an enormous enlargement of the uterus, due to the rapid development of a maternal placenta under the influence of the foreign body. In this case a thin glass rod had been introduced.

(4) In this specimen a thin glass rod had been introduced into one horn and a platinum wire into the other uterine horn, the glass rod causing a more marked reaction than the platinum wire.

(5) This effect of the foreign body is not due to lateral tension exerted upon the uterine mucosa. No reaction takes place in this specimen, in which lateral tension was exerted upon the uterine wall by means of a small wooden plate which was fastened

to the peritoneal coat of the uterus and over which the uterus was kept stretched by means of ligatures.

(b) Specimens showing results of experimental pneumonectomies in rabbits. Dr. E. M. Von Eberts, Montreal.

Operation, Nov. 10, 1909, right pneumonectomy. Aspiration of eviscerated cavity. Killed Jan. 5th, 1910. Specimen hardened in formalin. Removal of ribs. Complete obliteration of cavity with but slight deformity of bony thorax. The elements entering into the obliteration of the eviscerated cavity are found to be from below upwards: (a) the diaphragm; (b) the hypertrophied butterfly lobe occupying the median zone; (c) a small nodule of lung tissue surrounding the bronchial stump; and (d) in the extreme antero-lateral position the heart and pericardium.

Ventral aspect of thoracic viscera. Operation, Dec. 3, 1909. Right pneumonectomy. Aspiration of eviscerated cavity. Found dead Dec. 29, 1909. Injection of vessels. Hardened in formalin. Specimen shows complete obliteration of the eviscerated cavity by (a) heart; (b) butterfly lobe; (c) diaphragm.

Operation April 28, 1910. Fox terrier dog. Thoractomy in eighth interspace (left) under positive pressure. Intrathoracis gastro-oesophagostomy by suture following excision of one inch of cardiac end of oesophagus. Closure of thorax with pericostal sutures of silk. Animal made good recovery,—on May 15th taking solid food. Died May 18th—three weeks after operation. Autopsy showed necrosis with abscess formation about one of the pericostal silk sutures, the abscess cavity communicating with the left thorax. No leakage from the gastro-oesophageal anastomosis. Stomach contained milk. The pleuritis from which the animal died was no doubt secondary to infection of a pericostal suture.

11. *On the permanent tagging of Museum specimens.* E. L. Judah, *McGill University.*

Dr. MacCallum said that instead of the paraffin cardboard tags, described in Mr. Judah's paper, he had been in the habit for the past two years of using paraffined tape, about an inch wide, which was stamped with the consecutive entry number by means of a Bates automatic numbering machine, and was then dipped in boiling paraffin. A roll of tape bearing the consecutive entry number was kept ready for use, and served as a check on the number of the last specimen entered and the place of the new specimen in the entry book.

*12. *Demonstration of the gelatin method of mounting specimens, with illustration of some new points.* Dr. Joseph Kaufmann, *Montreal.* (Published in this Bulletin. See p. 11.)

13. *On a portable museum case.* PROF. HENRY ALBERT, *University of Iowa.* (Published in this Bulletin. See p. 16.)

A fine exhibit of dry and moist specimens showing special methods of preparation and mounting in gelatin and otherwise, and the preservation of the results of scientific research, also microphotographs, and Lumière polychrome photographs, was contributed by the Army Medical Museum, the McGill Medical Museum, Prof. Leo Loeb, Dr. Harvey Gaylord, Dr. Wilson, and Dr. Von Eberts.

Officers, Honorary and Active Members

OF THE

INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

MAJOR JAMES CARROLL, Curator, Army Medical Museum, Washington, D. C., Chairman of the Organizing Committee and first President of this Association.

Born, June, 1854.
Died August, 1907.

OFFICERS.

President: Prof. A. S. Warthin, University of Michigan.
First Vice-President: Prof. G. Sims Woodhead, Cambridge, Eng.
Second Vice-President: Prof. Souchon, Tulane University, New Orleans, La.
Third Vice-President: Prof. J. Ludwig Aschoff, Freiburg, Germany.
Councillors: Prof. W. G. MacCallum, College of Physicians and Surgeons, New York; Dr. D. S. Lamb, Army Medical Museum, Washington, D. C.; Prof. E. R. LeCount, University of Chicago, Ill.; Prof. F. F. Wesbrook, University of Minnesota; Prof. P. G. Woolley, University of Cincinnati; Prof. W. Ophuls, San Francisco, Cal.; Dr. George Whipple, Baltimore, Md.

HONORARY MEMBERS.

Prof. J. G. Adami, McGill University, Montreal, Canada.
Sir Jonathan Hutchinson, Post-Graduate School, London, Eng.
Prof. William Osler, Oxford, England.
Prof. William Welch, Baltimore, Md.

ACTIVE MEMBERS.

Adelaide University, Adelaide, South Australia, Dr. W. R. Cavenagh-Mainwaring, 1907.
Army Medical Museum, Washington, D. C., Major James Carroll, U. S. A., 1907; Major F. F. Russell, U. S. A., 1908; Capt. C. F. Craig, U. S. A., 1910; Dr. D. S. Lamb, 1910.
Baltimore, Md., College of Physicians and Surgeons, Dr. W. R. Stokes, 1908.
Baltimore, Md., University of Maryland, Dr. J. L. Hirsch, 1908.
Baltimore, Md., Women's Medical College, Prof. Claribel Cone, 1908.
Bender Hygienic Laboratory, Albany, New York, Dr. Thomas Ordway, 1910.
Birmingham, England, University of, Prof. R. F. C. Leith, 1907.
Bologna, Italy, University of, Prof G. Martinotti, 1910.
Boston, Mass., University School of Medicine, Prof. H. Watters, 1908.
Bristol, England, University of, Prof. J. Walker Hall, 1907.
Buffalo, N. Y., State Cancer Laboratory of, Dr. Harvey Gaylord, 1910.
Cairo, Egypt, Government School of Medicine of, Prof. Alex. Ferguson, 1907.
Cambridge, England, University of, Prof. G. Sims Woodhead, 1907.
Cambridge, England, Humphrey Museum of, Mr. F. A. Izzard, 1908.
Chicago, Ill., University of, Prof. E. R. LeCount, 1907.
Charing Cross Hospital Museum, London, England, Prof. William Hunter, 1907.
Christiania, Norway, University of, Prof. Francis Harbitz, 1908.
Cincinnati, Ohio, University of, Prof. P. G. Woolley, 1908; Dr. R. D. Maddox, 1907.
Cleveland, Ohio, Western Reserve University of, Prof. Wm. T. Howard, 1907.
Cologne, Germany, Pathological Institute of, Prof. Z. Jores, 1910.
Copenhagen, Denmark, University of, Prof. Johannes Fibiger, 1907.
Copenhagen, Denmark, Commune Hospital of, Dr. Victor Scheel, 1910.
Dublin, Ireland, Museum of The Mater Misericordiæ Hospital, Prof. E. J. McWeeney, 1907.

Duesseldorf, Germany, University of, Prof. D. Lubarsch, 1910.
Edinburgh, Scotland, College of Physicians and Surgeons of, Prof. J. Ritchie, 1907.
Edinburgh, Scotland, New School of Medicine of, Dr. James Miller, 1908.
Freiburg, Germany, University of, Prof. J. Ludwig Aschoff, 1907.
Friedrichshain Stadtissches Krankenhaus, Berlin, Germany, Prof. Ludwig Pick, 1907.
Geneva, Switzerland, University of, Prof. M. Askanazy, 1907.
Georgia State Sanitarium, Milledgeville, U. S. A., Dr. J. H. Hewitt, 1910.
Glasgow, Scotland, Pathological Museum of the Western Infirmary, Prof. Robert Muir, 1907.
Glasgow, Scotland, Department of Zoölogy, University of, Mr. R. A. Staig, 1910.
Harvard Medical School, Boston, Mass., Prof. Collins Warren, 1910; Prof. S. B. Wolbach, 1908.
Havana, Cuba, University of, Prof. J. Guitèras, 1907.
Iowa, University of, Prof Henry Albert, 1907.
Jefferson Medical College, Philadelphia, Pa., Prof. W. M. L. Coplin, 1907.
Johns Hopkins Hospital, Baltimore, Md., Prof. William Welch (Hon.), 1907; Dr. G. H. Whipple, 1910.
Laval University, Montreal, Canada, Prof. Eug. Saint-Jacques, 1908.
Liverpool School of Tropical Medicine, Liverpool, Eng., Dr. J. W. W. Stevens, 1910.
Lund, Sweden, Karolinska University of, Prof. M. J. K. A. Forssman, 1910.
Lyon, France, University of, Prof. Paul Courmont, 1910.
Manila, Philippine Islands, Dr. J. R. Barber, U. S. Army, 1908.
Manila, P. I., Bureau of Science of, Dr. R. P. Strong, 1908.
Manitoba Medical College, Winnipeg, Canada, Dr. E. S. Popham, 1910.
McGill University, Montreal, Canada, Prof. J. G. Adami (Hon.), 1907; Prof. F. J. Shepherd, 1907; Prof. H. S. Birkett, 1910; Prof. W. W. Chipman, 1910; Prof. J. L. Todd, 1910; Dr. Gordon Byers, 1910; Dr. Maude E. Abbott, 1907; Dr. W. W. Francis, 1910; Dr. Joseph Kaufmann, 1910; Mr. E. L. Judah, 1908.
Melbourne, Australia, University of, Prof. H. B. Allen, 1907.
Michigan, University of, Ann Arbor, Mich., Prof A. S. Warthin, 1907.
Minnesota, University of, Minneapolis, Minn., Prof. F. F. Wesbrook, 1907; Prof. Thomas G. Lee, 1910.
Missouri, University of, Columbia, Mo., Dr. W. McN. Miller, 1908.
Montreal General Hospital, Montreal, Canada, Dr. Lawrence J. Rhea, 1910.

Mount Sinai Hospital, New York, Dr. Emanuel Libman, 1908; Dr. F. S. Mandlebaum, 1910.

Nebraska, University of, Lincoln, Neb., Prof. R. H. Wolcott (Dean), 1907.

New Orleans, La., Tulane University, Prof. Edmond Souchon, 1907; Prof. C. W. Duval, 1907; Dr. Fraser Gurd, 1908.

New York Babies Hospital, Dr. Martha Wollstein, 1910.

New York, Bellevue Hospital Medical School, Dr. B. C. Crowell, 1910.

New York, College of Physicians and Surgeons of, Prof. W. G. MacCallum, 1907; Dr. Francis Carter Wood, 1907; Dr. R. A. Lambert, 1910.

Oswaldo de Cruz Institute Rio de Janeiro, Brazil, Prof Oswaldo de Cruz, 1910.

Oxford, England, University of, Prof. William Osler (Hon.), 1907.

Paris, France, Faculty of Medicine of University of, Prof. Pièrre Marie, 1910; Prof. Gustav Roussy, 1910.

Pavia, Italy, University of, Prof. Achille Monti, 1907.

Pennsylvania Hospital, Philadelphia, Pa., Dr. S. Canby Robinson, 1907.

Pennsylvania, University of, Philadelphia, Pa., Prof. R. M. Pearce, 1907; Prof. A. J. Smith, 1907.

Philadelphia, Pa., Medico-Chirurgical College of, Prof. Joseph MacFarland, 1907.

Pittsburgh, Pa., University of, Prof Oskar Klotz, 1908.

Prague, Austria, University of, Prof. R. Kretz, 1910.

Rochester, Minnesota, Dr. L. B. Wilson, 1910.

Rotterdam, Holland, University of, Prof. Josselin de Jong, 1910.

Royal College of Surgeons, London, England, Prof. Arthur Keith, 1910.

San Francisco, Cal., Cooper Medical College Museum, Prof. W. Ophuls, 1907.

San Francisco, Cal., Leland Stanford University, Dr. W. F. Snow, 1908.

St. Andrews, Scotland, University of Dundee, Prof. L. R. Sutherland, 1907.

St. Louis, Mo., University of, Prof. Leo Loeb, 1907; Prof. Guthrie McConnell, 1910.

Stockholm, Sweden, Karolinska Institute, Prof. Carl Lundborg, 1910.

Strassburg, Germany, University of, Prof. H. Chiari, 1910.

Toronto, Canada, University of, Prof. J. J. Mackenzie, 1907; Dr. W. G. Gallie, 1910.

Upsala, Sweden, University of, Prof. Ulrik Quesnel, 1910.

Vienna, Austria, University of, Prof. Anton Weichselbaum, 1907.

Vienna, Austria, Pathologico-Anatomical Institute, Prof O. Storck, 1910.

Washington, D. C., Bureau of Animal Industry, Dr. J. R. Mohler, 1908.

U. S. Public Health and Marine Hospital Service, Washington, D. C., Passed Assistant Surgeon Edw. Francis, 1910.

Wiesbaden, Germany, Prof. G. Herxheimer, 1910.

THE

INTERNATIONAL ASSOCIATION
OF
MEDICAL MUSEUMS

BULLETIN NO. IV

EDITED BY
ALDRED SCOTT WARTHIN, M.D.
MAUDE E. ABBOTT, M.D.

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TABLE OF CONTENTS

PAGE

EDITORIALS:

1. *Das Verein zum Austausch der Anatomischen Präparaten* 5
2. The Establishment of a Central Museum for the Preservation of Microscopic Specimens Showing the Results of Original Research.............. 7
3. The Section of Museum Technique of the XVIIth International Congress of Medicine............ 8
4. Museum Teaching 9

OBITUARY:

Leonard W. Williams.......................... 11

ORIGINAL COMMUNICATIONS:

GENERAL ARTICLES:

1. The Ideal Museum 12
Prof. H. E. Robertson, Minneapolis.
2. The Importance of Concentration in Museum Collections for purposes of Research............. 16
Prof. Louis B. Wilson, Rochester, Minn.
3. The Need of a Medical Historical Museum....... 19
Davina Waterson.
4. Interchangeable Charts for Museum and Demonstration Work 21
Joseph Macfarland, Philadelphia.

MUSEUM CLASSIFICATION:

5. The Classification of Specimens in the Medical Museum of McGill University................ 23
Maude E. Abbott.

MUSEUM TECHNIQUE:

6. An Easy Method of Substituting the Skull Cap.... 27
I. J. Fibiger, Copenhagen.
7. A Method of Mounting Thin Membranous Tissues and Slices of Organs fixed by Kaiserling's Method in Gelatin between Plates of Glass..... 28
J. H. Hewitt, Texas.

PAGE

8. The use of Metallic and Hard Rubber Frames in Mounting Tussues between Plates of Glass..... 37
J. H. Hewitt, Texas.

9. A Convenient Kaiserling Bath Cabinet........... 40
H. E. Robertson, Minneapolis.

10. A New and Inexpensive Solution for the Mounting of Museum Specimens.................... 41
R. L. Frost, Sheffield.

11. An Inexpensive Oil-Method for Mounting Pick-Kaiserling Specimens 42
Joseph Marshall Flint and Carl Kellner, Yale.

12. The Use of Oil as the Final Preservative for Specimens, the Natural Colours of which have been Retained 44
Henry Albert, Iowa.

13. Tagging of Museum Specimens 45
E. L. Judah, McGill University, Montreal.

14. A Base for Museum Jars...................... 47
Henry Albert, University of Iowa.

15. A Slide Cabinet for Storage of Large Numbers of Slides 48
Oskar Klotz, Pittsburg, Pa.

EXPERIENCE DEPARTMENT 50

DEPARTMENT OF EXCHANGES 54

REPORTS:

Fourth Stated Meeting of this Association........ 60
Meeting of British Pathologists, May, 1911....... 64
Fifth Stated Meeting of this Association......... 66
Meeting of Members Resident in America, May, 1913 78
Erste Liste der bei der Mikroskopischen Zentralsammlung in Frankfurt a.M., Eigenangenen Mikroskopischen Prapaerate 80

CONSTITUTION AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS 81

SAETZUNGEN DES VEREINS ZUM AUSTAUSCH ANATOMISCHER PRAPAERATE.............. 83

LIST OF OFFICERS, HONORARY AND ACTIVE MEMBERS OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS............ 87

The International Association of Medical Museums

BULLETIN NO. IV.

Ann Arbor, Michigan, and Montreal, Canada

August 1, 1913

EDITORIALS

"DAS VEREIN ZUM AUSTAUSCH ANATOMISCHER PRAEPARATEN."

In May, 1911, the announcement was received from Prof. B. Fischer, Senckenberg Institute, Frankfurt-on-Main, of the formation of a new Association among the Pathologists of Germany, which has as its objects the exchange of anatomical and histological material and the erecting of a central microscopical collection, where the results of scientific investigations may be preserved. The new Society, which is known as the "*Verein zum Austausch Anatomischer Präparaten,*" is formed in direct connection with the *Deutsche Pathologische Gesellschaft,* the meetings of the two bodies being held jointly, and the committee of the Exchange Society being formed by two members of the Executive of the *Deutsche Pathologische Gesellschaft,* together with a President, Vice-President and Secretary-Treasurer drawn from among its own members. A circular letter of invitation to membership, issued to German Pathologists, states that the German Exchange Society is framed along the lines of the International Association of Medical Museums, of which, in its constitution, it is declared to be a branch, the central depot of the *Verein* at the Senckenberg Institute at Frankfurt-on-Main being constituted the central depot of Exchange in Europe for the International Association of Medical Museums, while the Director of this Institute, who is *ex-officio* the Secretary of the *Verein*, becomes the general European Secretary of the Medical Museums' Association. These conditions were arranged before the organization of the German branch by correspondence between Prof. Fischer and the President and Secretary of the International Association of Medical Museums, and were concluded with the advice and approval of Prof. Aschoff, under whose direction the European section of the Association was placed at the meeting at Washington in May, 1910.

The formation of this *Verein* in Germany brings the International Association of Medical Museums into the same close connection with the *Deutsche Pathologische Gesellschaft* as was recently established with the American Association of Pathologists and Bacteriologists. It is hoped that similar co-operative action with the Medical Museums Association may be taken in England by the Anatomical and Pathological Societies of Great Britain and Ireland. The union of these great national bodies, through an international medium which is directly concerned with the interchange of scientific material, the development of preservation methods, and the storage of the results of scientific work, should be of great practical advantage, and would mark a step in advance in the domain of scientific medicine.

A point of great interest in the organization of this German branch of the Association was the establishment at Frankfurt-on-Main of a central microscopical collection, which has as its objects the maintenance and preservation of valuable microscopical specimens, showing the results of original investigations. The Senckenberg Institute undertakes the expense of the preservation and cataloguing of these specimens in return for the rights of ownership in the collections, which is open to members and others for study and for the furtherance of scientific criticism. The first list of publications from which the original material has been presented to the Senckenberg Institute, was issued by Prof. Fischer in May, 1913. See page 80.

Such a central collection of research material is an extension of the sphere of activities of the International Association of Medical Museums proper, and one that was sure to commend itself to the Executive of this body for wider adoption. As seen from the previous editorial and from the reports of the meetings of the Association in 1912-13, the organization of the central microscopical collection at Frankfurt-on-Main has been followed by the establishment of a similar research Museum in North America.

THE ESTABLISHMENT OF A CENTRAL MUSEUM FOR NORTH AMERICA FOR THE PRESERVATION OF RESULTS OF ORIGINAL RESEARCH.

While in investigations of a purely experimental character it is usually possible for other investigators to repeat the experiments and to either confirm them or to discover sources of error, in work of microscopical character in which conclusions are based on the examination of specimens which frequently cannot be duplicated, or can only be duplicated under the greatest difficulties, the confirmation or rectification of the work is almost impossible. Furthermore, very important material for investigation remains deposited in various laboratories and is thus almost lost to science, while the same material, if compared with similar material and with new specimens found by a subsequent investigator, might serve a most useful purpose in the progress of science.

These considerations induced the writer, on the occasion of the first general meeting of the American Association for Cancer Research in New York, 1907, to propose the creation of a central museum in which microscopical specimens concerning cancer, could be collected, kept for exchange, and be made easily accessible to other investigators who might wish to re-examine those specimens and compare them with material which they themselves were studying. This plan was aproved by the meeting, but later it happened that the necessary steps for the carrying out of this motion were not taken.

Some years later a similar though more comprehensive plan was realized in Germany, where a central museum for the preservation of microscopical specimens was installed under the auspices of the Senckenbergische Gesellschaft.

While it seems advisable that some central agency should exist, through which an international exchange of important specimens can be accomplished between investigators of different countries, it does not appear advantageous that all the specimens of investigators in various countries should be deposited in one central museum. Such a plan would make it difficult for those workers, who are in all probability most concerned in the further extension of a certain line of investigation, to obtain for renewed examination, the sections which they need. It seems to us very much more preferable that each country should have its own museum, in which all the important specimens studied by the investigators are preserved and sent to all students of the same country who should be interested in the further study of those specimens. There should be in addition, a central office for international exchange through which specimens located in the museums of the different countries can be obtained by investigators living in another country. Such a plan seems to combine all the advantages without any of the disadvantages of one single central international museum.

In accordance with these ideas, at the last meeting of the International Association of Medical Museums, a committee was formed, with the writer as Chairman, to consider the establishment of a museum of microscopical specimens, especially those representing research for the United States and Canada. This committee accepted gladly an offer made by the Medical Faculty of McGill University to provide the necessary space and care for the preservation of all the important specimens of the various institutions of research on this Continent. One of the principal considerations which guided the committee in selecting the Medical museum of McGill University as the best location for this museum, was the fact that they could be assured that Dr. Maude Abbott would be ready to act as curator of this museum, and they felt that this work could not be entrusted to one more qualified to carry it out successfully.

LEO. LOEB.

THE SECTION OF MUSEUM TECHNIQUE OF THE XVIITH INTERNATIONAL CONGRESS OF MEDICINE.

By special invitation, the organization of this Section of the Congress Museum was undertaken by the International Association of Medical Museums with the collaboration of the Museum Committee of the Congress. Circulars were sent out under the joint action of these two bodies both to the members of this Association and also to other Pathologists, urging their cooperation by the sending of exhibits illustrating the subjects of Museum administration, housing and display of Museum material, preparation and preservation of specimens, Museum cataloguing and teaching. Application forms were enclosed to be returned at once to Mr. H. W. Armit, Honorary Secretary of the Museum Committee of the Congress, the exhibits to be forwarded to him at the Pathological Museum, Imperial College of Science, South Kensington, London, not later than August 2nd. The same circulars translated into German have since been sent by Prof. B.

Fischer of the Senckenberg Institute to all the members of the *Deutschen Pathologischen Gesellschaft.* We learn through Mr. Armit and Prof. Keith that these efforts have already met with considerable success, many application forms from widely different sources have already been received by them and the section promises to present novel features of much interest especially to members of this Association.

A room has been reserved for the Section of Museum Technique at the Imperial College of Science, South Kensington, within the limits of the Congress Museum, and adjacent to the apartment in which the Triennial meeting of the International Association of Medical Museums will be held. The exhibits of this Section are intended both to give opportunity for the demonstration of special Museum methods and also to present to the profession the uses to which the Medical Museum may be put and the scope and standard to which it may obtain. It therefore meets the especial objects for which this Association exists and every member in attendance at the Congress should visit it without fail.

MUSEUM TEACHING.

For a number of years past gross pathological demonstrations have been given in the McGill Medical Museum, demonstrations which are not intended to replace post mortem work at the autopsy table, but rather to co-operate with it and to form a link with clinical medicine. The consensus of opinion at present is, that clinical medicine cannot be taught in lectures alone and this is equally true of pathology. The visual impression that the student gets from seeing a number of specimens which demonstrate a large series of lesions of a certain organ, the commoner lesions being illustrated by larger numbers of specimens, helps to fix in his mind the diseases in general to which a certain organ is subjected, as well as giving him more or less statistical data as to the relative frequency with which a given organ is attacked by a certain type of lesion. This is only possible by museum teaching. Conversation with students and graduates who have followed such a course, has convinced us that this method of teaching pathology, or rather, clinical pathology, is an extremely favorable one and helps them considerably in their clinical studies by tending to clearly associate clinical symptoms and signs with pathological lesions.

With our present method of perfect preservation of colours and perfect mounting in anatomical relations, students have little or no difficulty, after some training, in treating the specimens just as if they were handling fresh post mortem material, and repeated close observation of the student work in our school has convinced us that this method will in the near future replace the greater part of didactic teaching in special pathology. It must however, not be forgotten, as was said at the outset, that these methods are not meant to replace teaching in the post mortem room on the fresh material. In post mortem work one may get isolated cases, or a series which may repeat each other, so that a student may see half a dozen autopsies, all representing more or less similar conditions, with of course some modification, as it is extremely rare to find two cases alike. On the other hand the Museum demonstrations have the advantage of showing not only the type of lesions seen at one time in the post mortem room, but also their early development, as well as their late complications, and the difference between these and other lesions that the same organ is subjected to. This method, of course, attains its greatest value when the demonstrations are given to small groups of students; each one is shown the important points or changes in question on the specimen, and often this gross observation is supplemented by a microscopic slide of the specimen at the same time. Such teaching, done by visual demonstrations, eliminating as much theory as possible, and calling forth the personal observation and information of the individual student by continuous interrogation, saves the student much time, makes the subject of extreme value, and the teaching second to none. This method, which has been followed for many years in England, is practically new in America.

An important point which adds interest to the demonstrations is the fact that the most important points in the clinical history of the case, are impressed upon the student before the specimen is shown. He reconstructs a pathological picture in his own mind and tries to corroborate his deductions by the specimen and the remaining anatomical diagnosis of the autopsy. The value of such demonstrations is considerably increased when they are given in combination with the practical clinical work at the hospitals. The advantage of being able to collect at short notice a large number of specimens which will clearly demonstrate the complete series of lesions mentioned by the clinician, adds greatly to the importance of the Museum teaching.

J. KAUFMANN.

OBITUARY

LEONARD W. WILLIAMS.

It is with deep regret that we record the tragic death of Dr. Leonard W. Williams, who was instantly killed on September 26th, 1912, while operating an elevator in one of the Buildings of the Harvard Medical School. Dr. Williams was a graduate of Princeton, and of Brown University, at which institution he was made Assistant Professor of Biology in 1903. Here he published a monograph on the anatomy of the squid, and wrote the first detailed and satisfactory account of the complex mechanism of the lobster's stomach, and published various papers on other marine crustaceans. Since 1908, when he became associated with the Department of Comparative Anatomy of Harvard Medical School, the study of vertebrate development became his chief pursuit. He made use of the extensive embryological collections gathered by Professor Minot, and described the somites of the chick, and notochord of mammals in important papers. The accuracy of his work on the notochord has been shown in a critical review by Dr. Bruni of Turin. At the time of his death he was working on a treatise upon the Anatomy of the guinea-pig, the material for which he had obtained during a recent period of study in Freiburg. An active research worker and an incessant collector, his skill and industry did much to develop the collections of the Department of Anatomy of the Harvard School.

Dr. Williams was elected a member of the International Association of Medical Museums in 1910, and already the stimulus of his enthusiasm and of his interest in all matters of Museum Technique and management had made itself felt among us; in his death the Association has lost a valued member and a warm friend.

ORIGINAL COMMUNICATIONS

General Articles

THE IDEAL MUSEUM.*

By H. E. Robertson, M. D.
Associate Professor of Pathology and Bacteriology,
University of Minnesota.

The ideal pathological museum must be in a teaching institution and must be primarily organized for teaching purposes. No other system can be conceived that will fulfil the logical pathological museum which is commonly in association with medical colleges. The principles set forth apply with equal force to museums in other departments of university activity.

Physical Equipment. Such a museum is located in readily accessible, well lighted rooms, with white metal stacks and shelving. A portion of the main room is set aside for records and a stenographer is in charge of these and of the physical welfare of the rooms, stacks and specimen jars. In close association with these rooms are both the teaching laboratories and the museum preparation room.

Obtaining of Specimens. The morgue and autopsy room are located in the same building and suitable specimens from autopsies after examination and sectioning, are placed at once in the initial preservative. The greatest problem is in the handling of material which comes from outside the laboratory. This is solved by placing in the clinical laboratories associated with the hospitals large jars of preservative which are readily accessible. Accompanying these jars is a card of instructions about the proper initial handling of gross specimens. At suitable intervals the material is collected and transferred to the museum preparation room. At autopsies in private houses, undertaking rooms, etc., a special enamelled pail with tight cover is used to carry the first solution. Further, a circular is issued to all possible contributing physicians and hospitals explaining how specimens should be examined and preserved for museum purposes. The list of instructions issued reads as follows:

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* Read at the fifth stated meeting of the International Association of Medical Museums, Philadelphia, Pa. 1912.

1. Examine entire gross specimen and dictate or write a brief description of its important features, giving measurements, colors, shape, etc.

2. Make clean smooth sections through the entire mass, using a sharp amputation or other suitable sectioning knife.

3. Choose those portions illustrating the most important characters and cut slices not over one and one-half inches thick, trim them neatly with scissors or knife, gently wipe free blood and fluids from surfaces with a towel and, without washing in water, place at once in the preservative provided.

Mucous membranes or other surface specimens, and special dissections should be gently stretched out and pinned on thin boards.

5. Where time will not permit, or the specimen is too soft, containing cysts or abscesses, etc., or the proper plane of sectioning is not apparent, or it is desired that the entire specimen be preserved *in toto,* place it in the preservative and send at once to the museum preparation room.

6. Accompany each specimen with proper history of source, clinical data, time of removal, etc., and express your wishes in respect to its preservation.

7. Place in the small bottles of preservative provided, thin bits of tissue for microscopic examination. These should be carefully selected and not over 4 mm. thick.

8. If possible, accompany material with photographs of patient, gross specimen and especially cut surface.

Systematic preparations of this nature will afford to every museum, no matter how poorly situated, an adequate amount of good material.

The Preparation Room. This room is in charge of a laboratory-trained graduate of medicine who is experienced in the preparation of gross and microscopic material and is a teacher in the pathological courses. He is above all an enthusiast about museum specimens, loving the work for its own sake and zealously alert in regard to every detail. His entire time is devoted to the museum, autopsies, teaching and research work. The room is ample in size and particularly well lighted. Cupboards and shelves contain museum jars of various sizes and shapes with accessories. Carboys swinging in frames mounted on standards contain the selected preserving fluids and a readily operated cabinet is conveniently arranged for containing specimens and passing them through the different solutions. A bench before a window equipped with sectioning knives, dissecting instruments and soft pine boards on which to cut specimens is the working table of the director of the museum. Bottles of microscopic material and slide holders each have proper places for storage. At another portion of the bench are freezing, celloidin and paraffin microtomes together with stains and solutions. These are in charge of a trained technician who, as soon as a specimen is received is prepared to cut a frozen section for preliminary study. A photographic plant equipped for gross and microscopic photography is a valuable accessory.

Records. Each specimen is given a routine autopsy or operation number and complete records of this material are preserved in suitable binders, the entire year's records being bound into separate volumes at the end of each year. A note is made of specimens saved for the museum and their location on the shelves is finally noted. Duplicate copies of these records are made for the preparation room for purposes of ready reference. A card catalogue is kept of all museum specimens, which is cross-indexed under the headings: Organ and Diagnosis. The label on each specimen states its location on the shelves, the organ, the diagnosis, the operation or autopsy number, preservative, date, and donor of specimen.

The microscopic description and final diagnosis is added to the records at the earliest possible date, every effort being made to keep these complete and adequate. In this matter of records eternal vigilance and constant oversight are absolutely essential.

Methods of Preservation. Only those methods of preservation and mounting which through long experience have been proved to give the best results are employed as a matter of routine. A special portion of the museum is devoted to a research department where are preserved duplicate portions of appropriate specimens which have been treated by special processes or new methods and mounted in various media, using different kinds of jars or original forms of sealing. Careful observations and records are made in regard to the effects of light and heat, the amount of softening, color, fixation, etc. In this way various methods suggested in the literature and original ideas may be thoroughly tested and their adaptability for routine work carefully proven.

Arrangement of Specimens. As a general rule, the material is grouped on an anatomical basis with types of the same lesion placed in one group. Space is left under each lesion for growth. Carefully selected and prepared specimens showing normal organs or suitable anatomical models are useful additions for teaching purposes. Spoiled specimens or poor illustrative material is replaced continually by better examples and the old ones are thrown away, this fact being recorded in the permanent record. The usefulness of any museum should not be impaired by turning it into a repository for antiques, no matter how much veneration the name of the donor may convey.

Teaching. Specimens as desired are carried to the students' laboratory on wheeled and rubber-tired trucks similar to those used in libraries for transporting books. The material for the day's lesson is placed on a long, well-lighted table surrounded by stools. Specimens suitable for handling are removed from the jars to white plates and covered with towels moistened in the preserving solution. Clinical and anatomical records are rendered easily accessible to the students. As far as possible microscopic slides of the gross material are furnished and the students urged to examine and compare them both and to write clear, short, scientific descriptions.

Research. Every resource of the museum is placed at the disposal of the research worker, and records, extra microscopic preparations and special methods are used to assist his individual needs. The younger men are urged to report the more rare and interesting specimens with literature reviews. The members of seminars, pathological and other scientific societies are provided with every facility and encouraged to use the museum material to illustrate their papers. In addition as many fields of major research as are possible are instituted and encouraged in connection with this material.

In this portrayal of the ideal I have endeavoured to follow only logical and practical conceptions. Not one single impossibility has been indicated. What a vast improvement it would mean in the development of the science of medical education and research if every museum were thus equipped and operated. To carry out these plans it is necessary for each one of us to become a centre of dynamic enthusiasm, working and talking with clear cut ideals and unrelenting energy. My best wishes for success go to you all.

THE IMPORTANCE OF CONCENTRATION IN MUSEUM COLLECTIONS FOR PURPOSES OF RESEARCH.*

By Louis B. Wilson, M. D., Rochester, Minn.

It is interesting to trace the psychology of museum collecting. The impulse to collect probably has its origin well below the human animal, as is shown in the bright-object collection of the magpie and crow. In the young homo it frequently finds its early expression in the acquisition of bright colored ribbons, postage stamps, tobacco-tags, etc. The primary incentive in such collecting is undoubtedly the element of ownership, that is, the pleasure of possession.

When the average young man, without having previously passed beyond this psychologic stage in his postage-stamp or other youthful collecting, becomes a practitioner of medicine, he is apt to acquire and store up embryologic and pathologic material with, consciously and unconsciously, almost the same primal motive that moves the magpie to collect bright stones about its nest. The widespread and far-reaching effect of this elemental and uncultured psychologic factor is seldom appreciated. It results in thousands of most excellent specimens being accumulated and stored either as office advertisements or, more frequently, as back-room junk in the establishments of isolated private practitioners of medicine.

The second phase in the psychologic development of the individual is usually indicated by the awakening of a desire to study the specimen "some time"—a vague half-formed determination which is usually an ever-receding will-o'-the-wisp. The failure on the part of the private practitioner to really study specimens is due to the fact that if he has the time for the work he seldom gets specimens; and if he does get specimens he is too much interested in his practice to take the time for their study.

Occasionally this vague impulse to find out what a specimen means is kindled into a feeble flicker of scientific interest sufficient to bring forth a "report of a case." This represents the third stage in the psychologic development of the individual, and occasionally, though wth great rarity, results in the making of a student who will take from his private practice sufficient time and energy to make real contributions to science.

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* Read before the International Association of Medical Museums, Chicago, April, 1911.

The fourth stage comes with a realization by the doctor of his personal inability to utilize the material which has come into his hands and with this realization a developing altruism which usually extends first and only to his *alma mater*. He remembers his teacher of anatomy or pathology, wraps the specimen in gauze or newspaper to save expressage, or at most crowds it into a jar, with barely enough alcohol to dampen it and ships it without data and by express *collect*, to his long suffering college professor. When next the donor visits the college which he has thus favored, he is disappointed if he does not see his contribution to science exhibited in a prominent place in the college museum with a label giving in large type the donor's name, etc., a final sop to his primal instinct of possession.

The fifth psychologic stage is the doctor's recognition not only of his own inability to utilize his specimens himself, but also the recognition of his responsibilties for the proper preservation of specimens and the placing of each where it will be of the greatest use to medical science. This comes with the partial realization of the debt which he owes to the ages of scientific investigation which have preceded and made him;—a debt the interest only of which he can hope to discharge in a small measure by devoting whatever material he may obtain to the furtherance of future science. He must come to see that it is not only his privilege but his professional duty to winnow out and save everything of value to medical science; that it is his duty to properly fix and preserve in an intelligent manner such material; and to place it where it can be properly utilized. He must appreciate the fact that material with no possible teaching value were better consigned to the furnace at once; that that which has only undergraduate teaching significance should be placed in the hand of the teacher who needs it; but that that which has research possibilities should go to the individual who is interested in and capable of finding out and giving to science the facts which may be shown by the specimen, it matters not whether this man may be the donor's own college, or state, or nation,—or whether he be located half-way round the world from the original collector. Unusual specimens should be sent—howsoever far—to the man who is most interested in and knows most about them. The selfish child's-play of untrained observers with important specimens has resulted in enormous loss to all the natural sciences. The correction of this practice will always remain a most difficult task, not only because of the natural human tendency of every research man to assume that he is capable of studying and reporting on all sorts of material even remotely connected with his speciality, but also because of his sometimes exhibiting a "porcine tendency" to get lengthwise in the trough.

I take it that this Society may be able to do a great deal not only towards starting streams of collecting, but also towards directing these streams into proper channels rather than permitting them to trickle about and finally sink into the sands of oblivion.

I would offer as a suggestion that this society, through its officers, in some manner seek to place before the men of the medical profession who are nearest the primary sources of embryologic and pathologic material a full statement of the necessity of the proper sorting, preservation, and distribution of the scientific material coming into their hands. Many times visiting physicians ask for data and are given it orally or, at most, written with a lead pencil. When, later, a specimen comes into their hands they have no knowledge or remembrance of the data. Would it not be feasible for this society to circularize at least the obstetricians and surgeons of America, explaining fully the needs of the museums, the methods of preserving and shipping specimens and including with such circular a small card made as indestructible as possible,—perhaps being printed on celluloid and varnished—and bearing the essential memoranda concerning the preservation and centralization of specimens? What material is wanted for research, who wants it, and how should it be fixed and preserved? Such a card could be readily carried by the physician in his pocket note-book or tacked in a prominent place on his desk where it would serve as a constant reminder of his responsibilities regarding the tissues which come to him first-hand.

I have said nothing concerning the importance of giving definite instruction to medical students on this subject. Most instructors in medical colleges are now doing this. It would seem, however, to be the duty of this society to try to reach the physician who is already in practice and who controls the bulk of pathologic and embryologic material.

THE NEED OF A MEDICAL HISTORICAL MUSEUM.*

By Davina Waterson.

It seems—until you begin it—the easiest thing in the world to gather materials for a life of any doctor of renown. But a writer who has sat down in the British Museum or another large library surrounded by some twenty selected books will most probably have his paper and his mind a blank by lunch time.

Consulting the older works he will find all that remains of the doctor in a formal note of condolence to the mourning relative from a Society, or in a funeral sermon giving none of the life here, but adjectively describing his qualifications for the life beyond. Turning to more recent volumes there is a record of degrees and appointments; some special achievement is given, but date and place are withheld. Very often it is said "Dr. Jones was the first to perform the operation for ......" but whether "the first" in his own State, country, or in the world is not given. I have filed away over two hundred references concerning writings, inventions and operations by American doctors, but dare not use one until I have spent days—perhaps weeks—verifying statements made by biographers.

The first idea is to write to relatives. Don't. Very rarely have they kept any letters; books have been sold when there was no son a doctor, or sold by him as shelf lumber. Boxes of instruments have drifted to the junk shop; drawings or MSS relegated to the garret and eventually sold as waste paper, and all trace of the man disappears as effectually as if he had been a criminal evading justice. The chief sources of revenue in medical historical research are literary confrères and second-hand book-shops. The "5 cent box" has often yielded valuable material, and a search through catalogues may bring in an autograph letter or a little four-page pamphlet which once set all the medical world by the ears. Some by Dr. Rush turned up in a grimy store off Oxford Street, London, and two letters from the old botanist, Alex. Garden (Gardenia) and Humphrey Marshall (Marshallia) were bought cheaply in a store in Boston. What a treasure now to Ohio would be the camera which old Dr. Theodatus Garlick, 1805-1884, made, and with which he was said to be the earliest to take a dagnerreotype. Where is the model of the Calorimeter invented by Dr. Robert Hare in 1820? of the electric machine John Shecut of South Carolina devised at the end of the 18th century? The "Tranquillity Chair" of Rush, reported to be still in the Medical Museum in Philadelphia? Who does not wish the relatives of some of our great medical illustrators both here and in Europe had given the original pictures to a medical museum. These, even in their published form are often marvellous in design, yet which medical museum can show one original drawing by W. P. C. Barton or Alex. Ramsay, by the Bell brothers or McLise? There ought to be a statute allowing free search by a medical commissioner through the attics and dusty cupboards of every doctor of note five years after death: he should also attend the auction of a confrère's effects and buy in any drawings, manuscripts, instruments, portraits, medals, certificates, etc., for a local medical museum. Dr. Howard Kelly found it a long and wearisome search getting good portraits of the forty men whose pictures he wished to reproduce for his Cyclopaedia of American Medical Biography, and five large fileboxes of letters show the difficulties he had in gathering even approximately correct data for the some thousand lives in the book. Initialless, dateless, clothed in a patchwork of ill-fitting adjectives, the men would peep out furtively from the ever-gathering biographical works purchased. A man as famous as Brown-Séquard had to be chased from America to Paris, from Paris to Dublin, from which city his daughter wrote saying no letters or diary of her father existed.

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*Read at the meeting of the International Association of Medical Museums, Chicago, April, 1911

Some medical booklover might do gracious work in gathering for each state first editions of notable books written by doctors born there. How conspicuously these would shine in a small western township; how little interest they possess for the crowd of ordinary practitioners in the big Philadelphian, Bostonian or New York medical libraries. The gathering of such a collection might even be done by studying catalogues by an intelligent local librarian and careful notes should be made of any inscription, notes or bookplate, and entered up. But there, alas, is the difficulty! Only a booklover would do it prettily. The bloodless entry, giving name, date and number of pages is not enough, and a little research would disclose some fact or human interest to note or insert.

The pathetically long obituary list in the *Journal of the American Medical Association* is a strong argument for gathering and preserving records of notable men passing away. One biographer of long ago says "* * * was the first to use a gig in the State." Let some aspiring biographer get accurate data of the "first to make his country rounds in an air ship," and he will have added a small but amusing bit of information for the doctors yet unborn.

INTERCHANGEABLE CHARTS FOR MUSEUM AND DEMONSTRATION WORK.

By Joseph McFarland, M.D.
Medico-Chirurigical College, Philadelphia.

The usual lecture room and demonstration charts, whether mere diagrams or elaborate coloured pictures are expensive to make, difficult to use because of the space they occupy, and difficult to store when not in use. Their size, which must be large for satisfactory lecture room illustration, makes them unwieldy and unhandy for use in the laboratory, and in most places their number is usually inadequate and their quality miscellaneous, so that they are more or less sources of disappointment and annoyance.

The history of the "Atlas" that is the subject of this paper, is very simple. Professor John H. Small, of the Medico-Chirurgical College of Philadelphia, desiring to show the students of his class one of the illustrations from Lehman and Neumann's atlas, and finding that it had come loose from the book, laid it in a photographic printing frame that happened to be at hand, by way of protecting it from destruction, and passed it about the classroom. The result was most satisfactory, and as I happened to see it going the rounds of the class, it occurred to me that an illustrative atlas built up upon that simple foundation might be very useful. The outcome has been most satisfactory. We secured gray card photograph mounts 10 x 12 inches in size, purchased a number of the best illustrated books upon Pathology and kindred subjects, cut out the pictures and the legends from the books, grouped and classified them and then pasted them upon the cards. We did the same with the best illustrated books on Histology, and with photographs taken in the clinics and elsewhere.

As our cards grew in number, we had special boxes made to contain them, and then had a special closet built to contain the boxes and the frames.

At the present time we have an illustrative atlas consisting of 48 photographic printing frames 10 x 12 inches in size, and nearly 600 cards upon which our pictures are mounted. These are all classified and filed so as to be of easy access, and it takes only a few minutes to put whatever group of pictures it is desired to show into the frames. The advantages are many. The 600 cards take up very little storage room, those of any group are all in one box and can all be transported anywhere in a moment, and when in use the charts are behind glass so as to be seen to perfect advantage yet be free from dust or dirty fingers. They are also capable of employment with the reflectoscope or other projection arrangements if desired.

We have now used the system for two years and find that it gives perfect satisfaction.

When we give laboratory instruction in Morbid Anatomy or in Morbid Histology, we place beside the mounted museum specimens and the microscopes, the charts, in their frames, illustrating the corresponding conditions, and thus place before the student not only the things themselves, but the pictures and diagrams and legends that explain them. This is equivalent to having the student consult many illustrations in a variety of text-books.

The framed charts can also be passed about the classes when not too large, or can be hung upon the laboratory walls as ornaments as well as for examination during the whole period of instruction, the charts in the frames being changed from time to time as the subjects of instruction change.

They are scarcely appropriate for passing around the lecture room as the time consumed in looking at the picture and reading the legends makes this impracticable and as the attention of the student would be too much distracted.

I do not want to give out the impression that this is an exclusive system of instruction. We have and use the large charts, and we also use lantern slides, but for laboratory demonstration we have found it to be the best system yet devised.

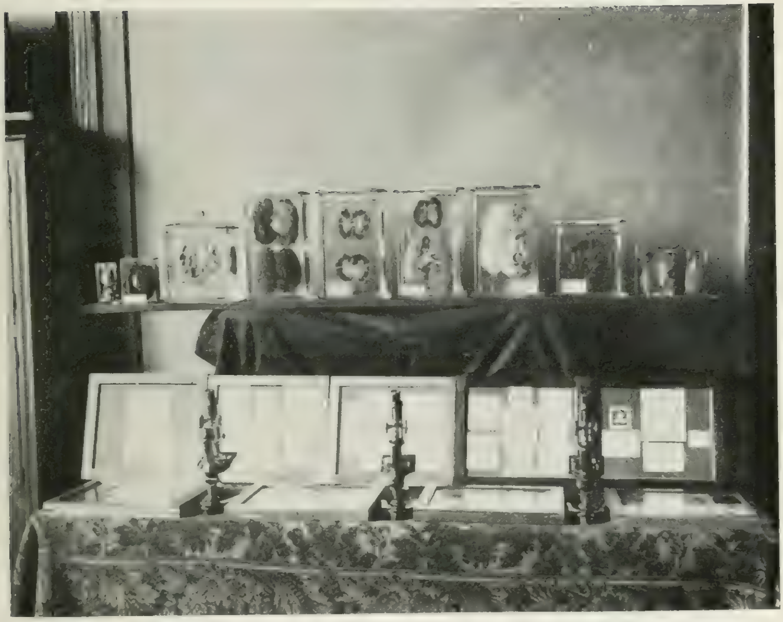


Fig. 1. The Teaching Frames Containing Series of Mounted Illustrations placed beside Series of Correlated Museum Specimens.

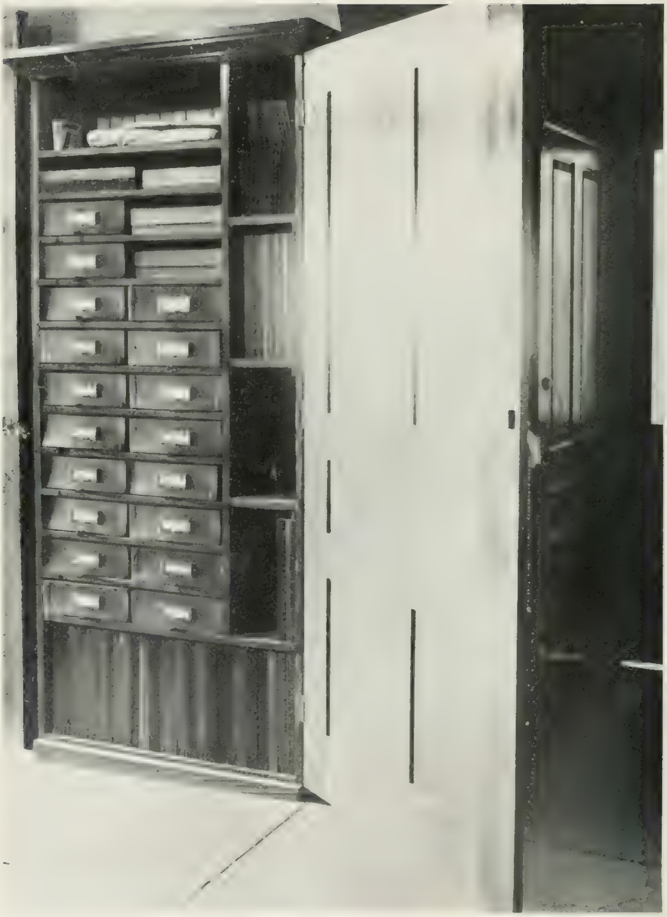


Fig. 2. Flat Filing System for Teaching Frames.

Museum Classification

THE CLASSIFICATION OF SPECIMENS IN THE MEDICAL MUSEUM OF McGILL UNIVERSITY.

By Maude E. Abbott, M.D.

The specimens in this Musem are arranged on a system of Museum classification introduced after a plan suggested by the late Professor Wyatt Johnston, in the year 1899, and followed successfully since. A descriptive number is used, in which the anatomical condition is represented by numbers before, and the pathological condition by numbers following the decimal point. The number of the individual specimen is indicated by a small index figure placed to the right of, and above the descriptive number. Thus 14.24^1 Thrombosis of the heart.

The advantage of this system is that it allows of indefinite expansion, the catalogue number becoming the shelf number, and each descriptive number forming a unit group to which specimens may be added at will without disturbing the logical sequence of the collection as a whole. The Anatomical Classification as given below is practically the same as that proposed by Dr. Haviland Field of Zurich for use in Medical libraries, but the Pathological Classification has been repeatedly amended and revised as practical necessity presented itself, until it assumed its present form. A more detailed explanation will be found in an article by the writer "On the Classification of Museum Specimens" in American Medicine, 1903, p. 541.

PART I.

THE ANATOMICAL CLASSIFICATION.

1. CIRCULATORY SYSTEM.
    11. Pericardium.
    12. Myocardium.
    13. Endocardium.
    14. Heart as a whole.
    15. Arteries.
    16. Veins.

2. RESPIRATORY SYSTEM.
    21. Nares.
    22. Larynx.
    23. Trachea and Bronchi.
    24. Lungs.
    25. Pleura.

3. DIGESTIVE SYSTEM.
    31. Teeth.
    32. Mouth. Tongue. Pharynx.
    33. Oesophagus.
    34. Stomach.
        344. Stomach contents.

35. Intestine.
  351. Small intestine.
  352. Appendix.
  353. Large intestine.
  354. Rectum.
36. Peritoneum and Mesentery.
37. Liver.
38. Gall Bladder and Bile Ducts.
39. Pancreas.

4. HAEMATOPOIETIC ORGANS & DUCTLESS GLANDS.

41. Bone marrow.
42. Lymph nodes.
  421. Haemo-lymph nodes.
43. Spleen.
  431. Spleen capsule.
44. Thymus.
45. Thyroid.
46. Parathyroids.
47. Adrenals.
48. Carotid Coccygeal Glands.
49. Pituitary Body.

5. UROGENITAL SYSTEM.

51. Kidney.
52. Ureter.
53. Bladder.
54. Prostate.
55. Urethra.
56. Penis.
57. Seminal Vescicles, Vas Deferens and Cord.
58. Testis, Epipidymis, Tunica Vaginalis.

6. FEMALE GENITALIA.

61. External genitalia.
62. Vagina.
63. Uterus.
64. Fallopian tube.
65. Ovary and parovarium.
66. Pelvic peritoneum and connective tissue.
67. Breast.
68. Generative system in pregnancy.
69. Ovum as a whole.

7. NERVOUS SYSTEM.

71. Membranes.
72. Cerebral vascular system.
73. Cerebrum.
74. Cerebellum.
75. Spinal cord.
76. Nerves.
77. Nerve ganglia.
78. Eye.
79. Ear.

8. MUSCULO-CUTANEOUS SYSTEM.

81. Skin.
82. Hair.
83. Nails.
84. Muscle.
85. Fascia.

9. OSSEOUS AND ARTICULAR SYSTEM.

91. Bones of cranium.
92. Bones of face.
93. Vertebrae.
94. Sternum.
95. Ribs.
96. Bones of upper extremity.
97. Pelvic girdle.
98. Bones of lower extremity.
99.

0. REGIONAL.

01. Head.
02. Face.
03. Neck.
04. Back.
05. Thorax.
06. Abdomen.
07. Pelvis.
08. Upper extremity.
09. Lower extremity.
59. Perineum.

PART II.

AMENDED PATHOLOGICAL CLASSIFICATION.

.1 ANTENATAL STRUCTURES and ABNORMALITIES OF DEVELOPMENT.

.11 Foetal Structures (Normal Anatomy).
.12 Malformations of Incomplete Development.
.13 Reduction in Size. (Hypoplasia.)
.14 Reduction in Number. (Syndactylism, etc.)
.15 Persistent Foetal Structures.
.16 Excess in Size.
.17 Excess in Number.
.18 Malposition or Heterotaxis; Abberant Structures.
.19 Anomalities due to Foetal Disease.

.2 CIRCULATORY DISTURBANCES.

- .21 Anaemia.
- .22 Congestion or Hyperaemia.
- .23 Haemorrhage.
- .24 Thrombosis.
- .25 Embolism.
- .26. Infarction.
- .27 Oedema.

.3 INFLAMMATORY PROCESSES.

- .31 Catarrhal or Desquamative.
- .32 Exudative inflammation.
  - .321 Sero-fibrinous.
  - 322 Fibrinous or plastic.
  - .323 Diphtheritic or membranous.
  - .324 Haemorrhagic.
  - .325 Suppurative or purulent (abscess).
- .33 Destructive inflammation.
- .34 Specific Inflammation due to Cocci.
- .35 Specific Inflammation due to Bacilli.
- .36 Specific Inflammation due to Acid-fast Bacilli, Spirilla, and Yeasts and Moulds.
- .37 Specific Inflammation due to Protozoa.
- .38 Specific Inflammations, Causative Agent still undetermined.
- .39 Productive or Proliferative Processes.

.4 INFECTIONS AND PARASITES.

(Note: .41 to .46 of this section are for bacteriological use only, the *lesions caused by different* microorganisms being found under .34 to .38. Only parts .47 and .48 Vermes, and .49 Insecta and Arachnida are to be used in the classification of pathological or clinical material.)

- .41 Cocci.
- .42 Bacilli.
- .43 Spirilla.
- .44 Higher Bacteria.
- .45 Cryptogenic Infections (Organism still undetermined).
- .46 Protozoa.
- .47 Flat worms.
- .48 Round worms.
- .49 Insecta and Arachnida.

.5 DISORDERS OF METABOLISM and INTOXICATIONS.

- .51 Diseases associated with changes in the blood and blood-forming organs.
  - .511 Chlorosis.
  - .512 Splenic anaemia.
  - .513 Splenomegaly.
  - .514 Leukaemia.
  - .515 Hodgkin's Disease.
  - .516 Pernicious anaemia.
  - .517 Haemophilia.
- .52 Intoxications associated with disorders of Ductless Glands.
  - .521 Exophthalmic goitre.
  - .522 Myxoedema.
  - .523 Cretinism.
  - .524 Acromegaly.
  - .525 Achondroplasia.
  - .526 Status lymphaticus.
  - .527 Tetany.
  - .528 Addison's disease.
- .53 Diseases due to Autochthonous or Heterochthonous Poisons of Organic Nature.
  - .531 Acute yellow atrophy.
  - .532 Eclampsia.
  - .533 Uraemia.
  - .534 Ptomaine poisoning.
- .54 Diseases due to Heterochthonous poisons of inorganic or plant nature.
- .55 Arteriosclerosis.
- .56 Diseases due to Defects of Nutrition.
- .57 Diseases of Disordered Metabolism.
- .58 Organic Nervous Disorders.
- .59 Functional Nervous Disorders.

.6 RETROGRESSIVE CHANGES.

- .61 Atrophy.
- .62 Degenerations.
  - .621 Acute, toxic, cloudy swelling.
  - .622 Fatty, Atheromatous.
  - .623 Mucoid.
  - .624 Hyaline and fibro-hyaline.
  - .625 Amyloid.
  - .626 Colloid.
  - .627 Calcareous.
  - .628 Hydropic and cystic.
  - .629 Keratinization.
  - .620 Various: Osseous, Gelatinous, Elastoid, Waxy, Fragmentation, Basophilic, etc.

- .63 Infiltrations.
  - .631
  - .632 Fatty.
  - .633 Biliary.
  - .634 Iron, haemosiderosis.
  - .635 Metallic.
  - .636 Other pigments.
  - .637 Anthracosis.
  - .638 Chalicosis.
- .64 Concretion. Calculus Formation.
- .65 The Necroses.
  - .651 Simple necrosis.
  - .652 Caseation.
  - .653 Gangrene.
  - .654 Ulceration of non-inflammatory origin (gastric ulcer).
  - .655 Perforation or rupture of non-inflammatory origin.
  - .656 Fat necrosis.
  - .657 Focal necrosis.
  - .658 The softenings, encephalomalacia, myomalacia, etc.
- .66 Stenosis due to Disease.
- .67 Dilatation due to Disease.

.7 PROGRESSIVE CHANGES.

- .71 Regeneration.
- .72 Hypertrophy.
- .73 Benign Tumours. (Of one of the modifications of fully formed connective tissue.)
  - .731 Fibroma.
  - .732 Fibromyoma.
  - .733 Lipoma.
  - .734 Chondroma.
  - .735 Myxoma.
  - .736 Osteoma.
  - .737 Odontoma.
  - .738 Glioma.
- .74 Benign Tumours (of one of the modifications of fully formed connective tissue.)
  - .741 Myoma.
  - .742 Neuroma.
  - .743 Myeloma.
- .75 Benign Tumours (of epithelial origin.)
  - .751 Adenoma.
  - .752 Papilloma.
- .76 Indeterminate Group (Tumours of uncertain histology or malignancy.)
  - .761 Angioma.
  - .762 Endothelioma (Psammoma.)
  - .763 Perithelioma.
  - .764 Mesothelioma.
- .77 Malignant Tumours. Sarcoma. Tissue-forming varieties.
- .78 Malignant Tumours. Sarcoma.
  - .781 Round celled sarcoma.
  - .782 Spindle celled sarcoma.
  - .783 Mixed celled sarcoma.
  - .784 Giant celled sarcoma.
  - .785 Melanotic sarcoma.
  - .786 Lymphosarcoma.
- .79 Malignant Tumours of Epithelial Origin.
- .70 Cystoma.

.8 TRAUMATA (from mechanical, chemical or physical causes.)

- .81 Wounds.
  - .811 Incised.
  - .812 Punctured.
  - .813 Contusions.
  - .814 Lacerations.
  - .815 Crushing accidents.
  - .816 Gunshot wounds.
  - .817 Bedsores.
  - .818 Abrasions.
  - .819 Ruptures.
- .82 Fractures.
- .83 Dislocations and Sprains.
- .84 Displacements.
  - .841 Hernia.
  - .842 Intussusception.
  - .843 Volvulus.
  - .844 Prolapse.
- .85 Impaction of Foreign Bodies.
- .86 Thermal Injuries.
- .87 Chemical Lesions.
- .88 Pressure effects produced by compression or traction from without, or distension from within.
- .89 Birth Processes.

.9 OPERATIVE PROCEDURES

- .91 Amputations.
- .92 Excision.
- .93 Plastic.
- .94 Ligature.
- .95 Incision.
- .96 Union and Replacement.
- .97 Fixation.
- .98 Experimental Surgery.
- .99 Miscellaneous Operations.

.0 SPECIFIC ARTEFACTS.

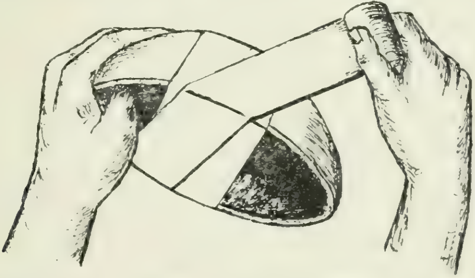
Museum Technique

AN EASY METHOD OF SUBSTITUTING THE SKULL-CAP.

By Professor Johannes Fibiger,
Copenhagen, Denmark.

On such autopsies as claim a thorough examination or preparation of the skull-cap, the removal of this part of the cranium often cannot be carried out, the disfiguration of the body being too great, and the removal consequently not permitted. The following method of substituting the skull-cap by the gypsum casting however, will prevent any blemish.

The sawed-off skull-cap after a thorough rubbing with glycerin is carefully wound with a 6-7 cm. broad gypsum bandage, the circumvolutions of which are placed radially with the top of the skull as centre.



When the layers of the gypsum bandage have obtained a thickness corresponding to that of the cranium, the cast is put away to dry.

Before the gypsum has stiffened completely, the part of the bandage which covers the cavity of the skull is cut out.

The cap is now easily removed and the gypsum cast is left as a bowl, the dimensions of which correspond exactly with those of the skull-cap.

By modelling and cutting with a pair of bone-scissors the brim may easily be made to fit correctly into the sawing line.

If the casting is not sufficiently solid, it may be further strengthened by a layer of gypsum on the inside of the cavity, which is finally stuffed with cotton.

The skull-cap then is fixed in its place, and the suturing of the scalp is carried out in the ordinary way.

The gypsum skull-cap may, if necessary, be fixed by some twine conveyed through a couple of holes in the squames of both temporal bones.

It soon will obtain the same hardness as has the cranium itself, and after the restoration of the body, no disfiguration of the shape of the head will be visible.

A METHOD OF MOUNTING THIN MEMBRANOUS TISSUES AND SLICES OF ORGANS IN GELATIN BETWEEN PLATES OF GLASS, FIXED BY KAISERLING'S METHOD.*

By J. H. Hewitt, M.D.

I have for some time been working on a method for mounting specimens between plates of glass, the object so preserved resembling, to a degree, an ordinary lantern slide. I have at length devised a method which has for me given favorable results, and which, I believe, may be suggestive to others for a better method or as an improvement on some method they have been accustomed to employ. I herewith take the opportunity of presenting the method, and any criticisms or suggestions that any one interested in it may have to offer will be gladly received.

The method consists essentially in the formation of a cell out of strips of glass, cementing substance and paraffin, placing the specimen to be mounted in this cell filled with Kaiserling III. gelatin mixed with sufficient (20%) formaldehyde to cause the gelatin to set, placing a coverglass over this and sealing.

A consideration of the method may be divided into the following headings:

1. Preparation of the Plates of Glass and the Cell.
2. Preparation of the Specimen.
3. Preparation of the Cover Glass.
4. Mounting the Specimen.
5. Placing the Cover Glass.
6. Preparing and Sealing the Mount.
7. Protecting and Ornamenting the Mount.
8. Preserving the Mounts.
9. Exhibiting the Mounts.
10. Troubles.

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* Read at the fifth meeting of the International Association of Medical Museums, Philadelphia, Pa., April 4, 1912.

PREPARATION OF THE PLATES OF GLASS AND THE CELL.

Ordinary plate glass may be used for the work, its fineness, etc., depending on the expense one is willing to assume to preserve the specimen. Discarded photographic plates have been used by me and have served my purpose excellently. By soaking these in water, hot or cold, the film can be readily removed and the glass is usually of a good quality. The size of the plate glass to be used will, of course, depend on the size of the specimen to be mounted. I have used sizes from 2 x 3 inches to 8 x 10 inches with favorable results.

For the construction of the cell strips of glass, about 1-8 of an inch in width, cut from ordinary window glass, or photographic plates that have been cleaned, have to be prepared. The glass can be readily cut in the laboratory with a rule and an ordinary glass cutter. These strips of glass are cut in lengths ¼ to ½ inch shorter than the length and the breadth of the glass plates between which the specimen is to be mounted. With these strips the cells are constructed by cementing them one on top of the other, pen-wise, around the plate of glass, ¼ to ½ inch from its edge. For the cementing substance any kind of rapid drying cement, or varnish, may be used. Immediately after construction the cells should be set aside for the cementing substance to harden. After this, the inner and the outer walls of the cell are covered with a thin layer of paraffin. This is necessary to make the cell water-tight, to prevent bubbles from coming in from between the strips of glass where the cementing substance may not have completely filled, or may have dried out, and further, to cover this cementing substance and thus prevent clouding of the gelatin, which I have found to take place with all the substances I have tried when a covering of paraffin is not used.

These cells may be constructed as deep as desired by successively adding strips of glass on top of those that have been placed in position. (See Figs. 1*a*, *b*.) All of the paraffin is carefully scraped and wiped off the top of the wall of the cell, after the paraffin on the side walls of the cell has hardened, and all other particles of paraffin or other extraneous matter that may be attached is scraped and wiped away, so as to leave all the surfaces as clean as possible. Paraffin with a high melting point should be used and all thin layers of it along the margin of the bases of the wall of the cell, inside and out, should be carefully scraped and wiped away with xylol and 95% alcohol, otherwise the warm gelatin may cause it to melt and to give trouble when the cover-glass is placed in position.

The finishing cell may be stored away for future use or used as soon as the paraffin on its wall has thoroughly hardened. Just before the gelatin is poured into the cell the inner surface of its bottom plate should be carefully moistened and rubbed successively with xylol and alcohol and wiped perfectly dry to insure a clean, clear, transparent inner surface to the glass.

PREPARATION OF THE SPECIMEN.

The method I use for the fixation of my specimens is that of Kaiserling, as given in Mallory and Wright's Pathological Technique. Ordinary membranous tissues, as pieces of pleura, pericardium, wall of blood vessels, portions of the gastro-intestinal tract, etc., are readily adaptable to this method of mounting. They can be rendered straight and smooth in the Kaiserling I. solution. Thin slices of organs, as livers, spleens, kidneys, etc., may be obtained in a number of ways, depending on the facilities the worker has at his disposal. A very economic and ready method, I have found, is by means of a very long-bladed knife, see Figs *2a, b*; in this case, a bread knife that had been sharpened to a very thin edge. With such a knife the slices can be usually cut with a single stroke and that insures a smooth surface. The thinness of the slices and the uniformity of thickness with this method of cutting, depend chiefly on the hardness of the organ and the steadiness of one's hand. With small organs I have made very free hand slices with an old discarded microtome knife. However, I have obtained my best results by a method which I shall now describe and a butcher's meat slicer. The slicer manufactured by G. S. Blakeslee and Company, and known as the Blakeslee Meat Slicer (Fig. *2 b*) is especially suited for this kind of work. It has a large circular disk blade that can be sharpened to a very keen edge and its carrying table is large enough to hold a whole lung or liver. To hold the organ in a firm immobile position, I imbed it by placing it, after it has passed through the Kaiserling solutions, in a pasteboard box with a firm bottom, with the broadest surface of the organ on the bottom, and filling the box with melted paraffin. After the paraffin has hardened the slides of the box are broken off, the paraffin cut away from the corners, and the paper bottom tacked with the specimen on a wooden block, see Fig. 3. This can be easily fastened in the meat slicer, which has an adjustment by which slices 1-32nd of an inch can be cut.

One of the troubles I early met with was the liquefaction of the gelatin. Tissues like kidney, spleen and muscle, during the warm summer months, invariably liquefied. The cause of this liquefaction has been the subject of some study and experimentation with me. It now appears to me to be due to a proteolytic ferment in these tissues that is not destroyed by the process of fixing (2). Accordingly, I now subject all my specimens to a process of heating to destroy the proteolytic ferments immediately before mounting. This I accomplish by placing the specimen in a pan or evaporating dish filled with Kaiserling III. The Kaiserling III. is then heated to 80 degrees centigrade over a flame. When 80 degrees is reached the flame is immediately turned out, it having been watched carefully during the process of heating. If the specimen is very large, it may be kept for some time in Kaiserling III., at a constant temperature of 60 degrees centigrade. This part of my method is still in the experimental stage, but so far, none of my specimens so mounted have liquefied. Certain membranous tissues, as tuberculosis of the pleura, tuberculosis of the omentum, the mesentery containing enlarged hyperplastic lymphnodes, and tuberculosis of the intestine appear not to liquefy without heating. The heating of certain tissues, as brain substance, may cause a certain amount of cloudiness from the coagulation of dissolved albuminous substances, apparently. This is usually not especially marked and is not in proportion to the advantage of having a gelatin which does not liquefy.

MOUNTING THE SPECIMEN.

The medium I have been using for mounting is made by melting 100 grams of gold seal or gold label gelatin in 1,000 cc. of warm Kaiserling III, over a water bath. After the gelatin has thoroughly melted and been dissolved, it is allowed to cool down to 40° C. The whites of two well-beaten eggs are then added and stirred in well. The mixture is then heated again over the water bath till the albumen has thoroughly coagulated and collected on top of the gelatin. It is then placed directly over the flame and boiled for a few minutes. The reaction is then rendered acid and is filtered to clearness through cotton. shown in Fig. 4. The cleared gelatin (it may have to be filtered repeatedly to get it perfectly clear) is allowed to cool to 45° C. The filtering is best accomplished by means of a filter pump and an aspirating bottle. A ready and convenient form of such is before using. Just before it is poured into the pans, which are to be described in a few minutes, a volume of 20% formaldehyde equal to ½% of the amount of gelatin is added. This is thoroughly mixed with the gelatin by pouring the mixture successively from one vessel into another for three or four times. It is then poured immediately into the pan containing the cell into which the specimen is to be mounted.

In order to avoid all possibility of bubbles of air getting inside of the cell and under the cover-glass, I have found it best to have the bottom plate, the cell and the specimen which is to be mounted, completely immersed in the liquid gelatin before it is attempted to place the cover-glass in position. This is accomplished by using tin pans, as shown in Fig. 5. These pans may be of varying sizes to suit the size of the plates of glass used. They should be at least ½ inch larger than the bottom plate on which the cell is constructed. By placing pegs, as shown at a, b and c, on two adjacent sides of the pan, straight edges or braces can be formed against which to press the bottom plate and cover in order to get them exactly superimposed one above the other.

To secure the specimen in the exact position desired, and to be sure it will remain there it is best to proceed in the following manner:

The specimen is laid in the cell in the desired position, then sufficient gelatin, mixed with 20% formaldehyde, as stated above, is poured into the cell to cover the specimen. The specimen is then smoothed out and pressed down to remove any bubbles that may be on its under surface. It is again adjusted to its correct and desired position. Any bubbles that may collect on the surface should be drawn off with a pipette. The gelatin is now allowed twelve hours to congeal and set, the pan containing the specimen and cell remaining undisturbed. For doing all the work at one time the pan is filled with the gelatin, the specimen placed in position and smoothed out to remove bubbles that may adhere to its under surface, care being taken that the upper margins of the cell are covered, and everything is ready for the placing of the cover-glass. Where the specimen is mounted by first securing, as described above, at the end of the required time the pan is filled with warm gelatin, prepared and mixed with 20% formaldehyde, till the margins of the cells are well covered with gelatin.

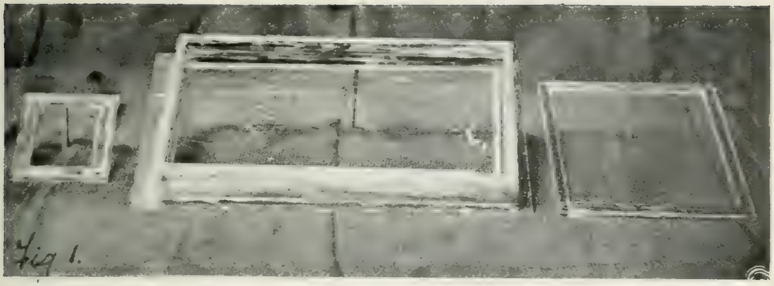

Fig. 1*a*. Showing Constructed Cells of Different Sizes, Shapes and Depths.

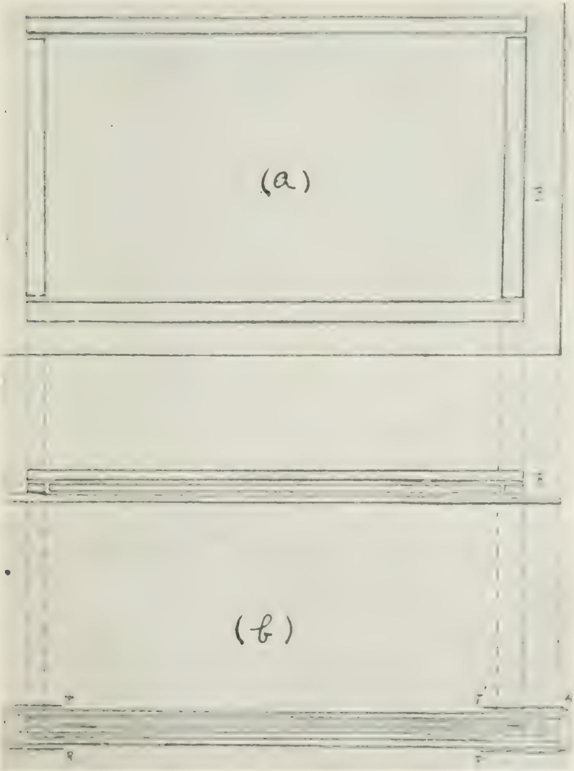

Fig. 1*b*. (*a*) Shows Plan and Section of the Constructed Cell.
(*b*) Section of the Cell with Cover Glass in Position

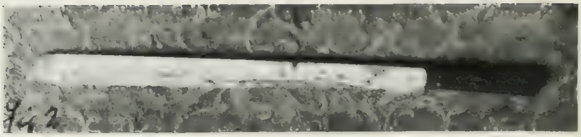

Fig. 2*a*. A Form of Long-Bladed Knife that can be Readily Obtained and is very Efficient for Cutting Thin Slices of an Organ with a Single Stroke.

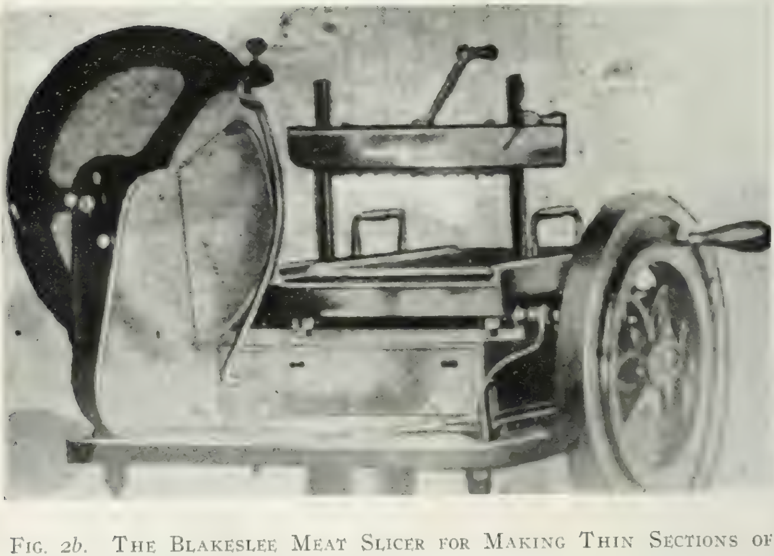

Fig. 2*b*. The Blakeslee Meat Slicer for Making Thin Sections of Organs Fixed in Kaiserling I.

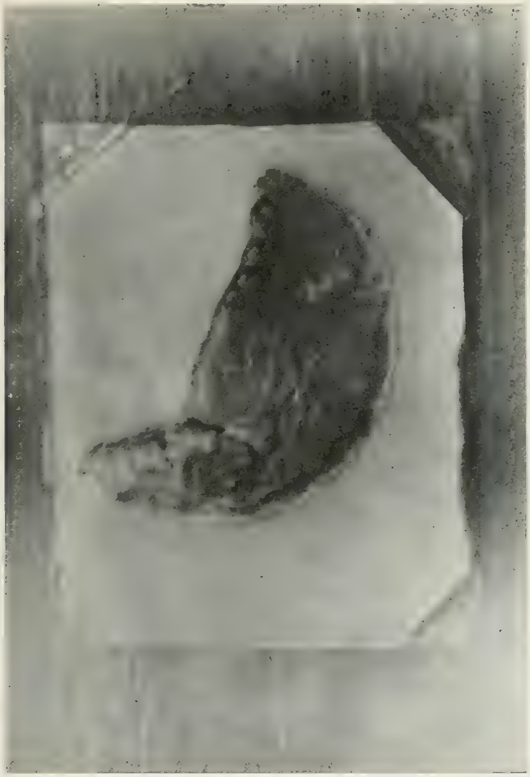

Fig. 3*a*. Organ after Fixing in Kaiserling I. Mounted in Paraffin and Fastened to a Block Ready for Slicing in a Blakeslee Meat Slicer.

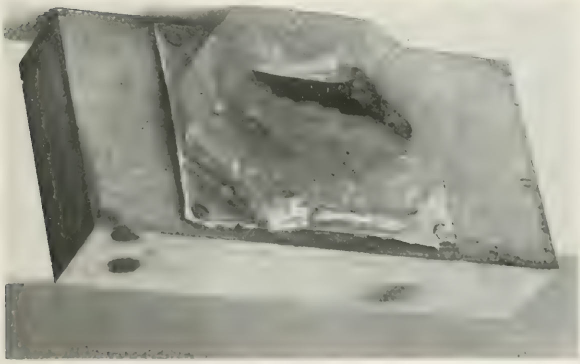

Fig. 3*b*. The Lung of an Infant, Fixed by Kaiserling's Method, Fastened in Paraffin and Tacked on a Box Ready to be Placed in a Meat Slicer and Cut into Thin Slices.

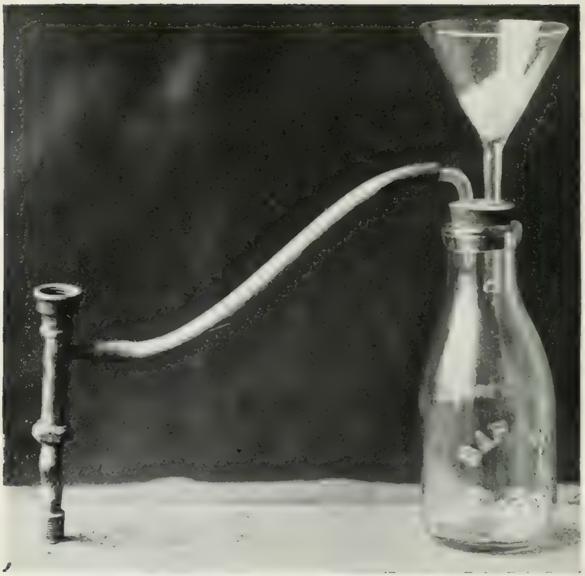

FIG. 4. A CONVENIENT FORM OF FILTERING APPARATUS FOR THE GELATIN. TO INSURE CLEARNESS AT A SINGLE FILTERING THE COTTON SHOULD BE WET WITH CLEAN WATER AND PACKED TIGHT IN THE NECK OF THE FUNNEL.

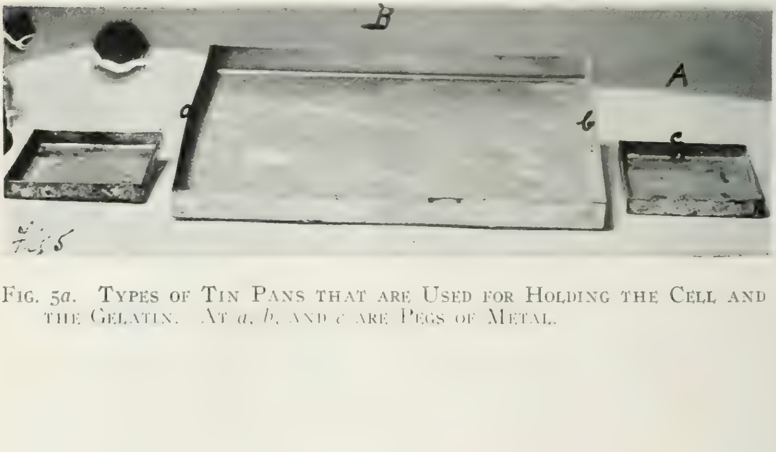

FIG. 5*a*. TYPES OF TIN PANS THAT ARE USED FOR HOLDING THE CELL AND THE GELATIN. AT *a*, *b*, AND *c* ARE PEGS OF METAL.

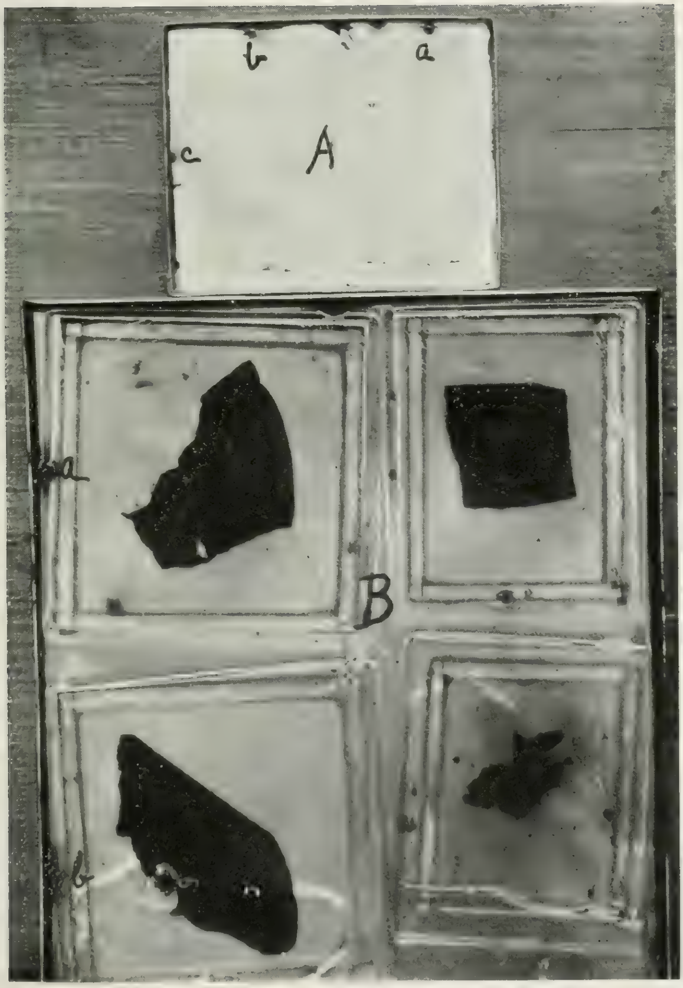

Fig. 5*b*. Tin Pans such as May Be Used for Holding the Kaiserling III. Gelatin into which the Cell and Specimen are Immersed and Covered. *A*, Small Pan; *B*, Large Pan. *a*, *b*, *c*, Pins for Aid in Adjusting the Cover Directly Over the Bottom Plate.

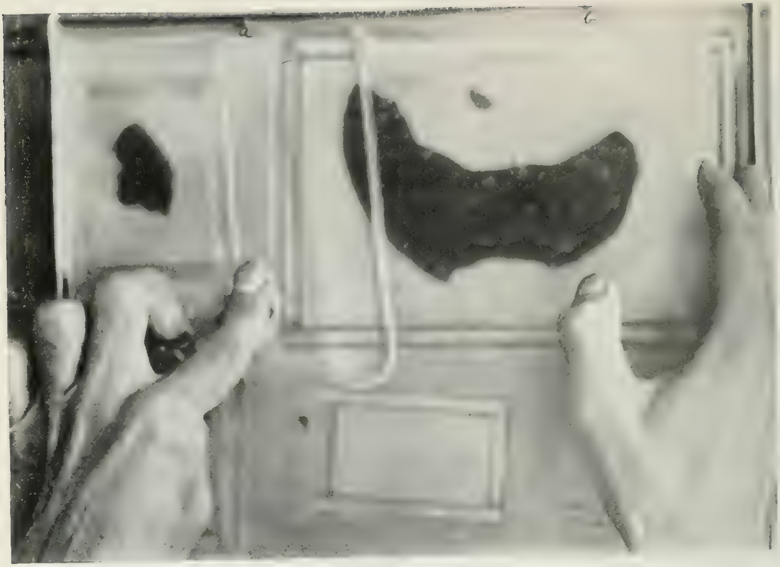

Fig. 6*a*. Placing the Cover Glass in Position Without Bubbles

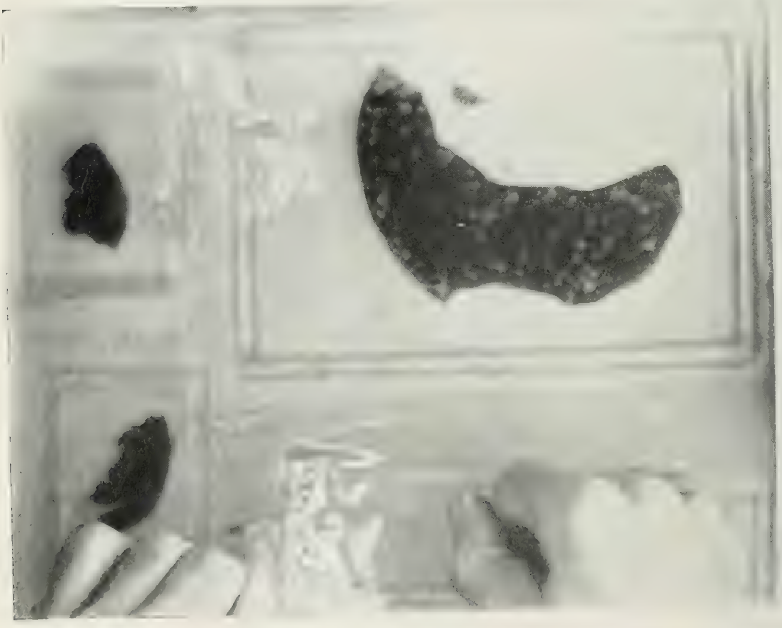

Fig. 6*b*. Adjusting the Cover Glass Directly Over the Bottom Plate of the Cell.

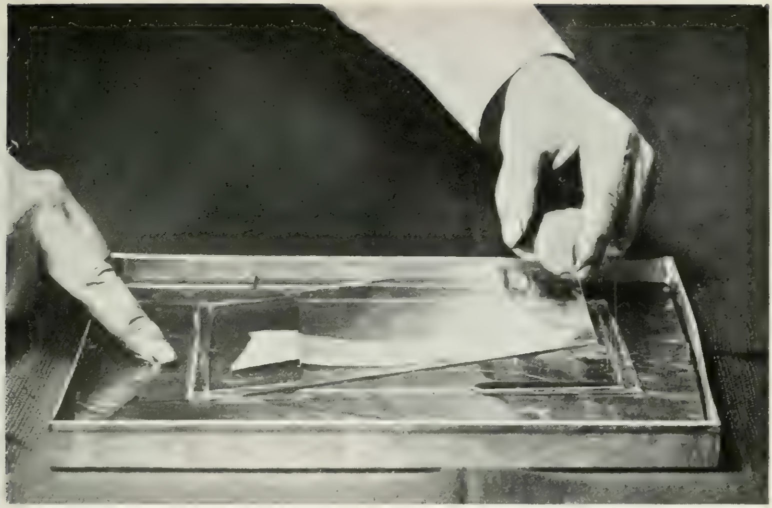

Fig. 6c. Showing the Method of Placing the Cover-Glass in Position.

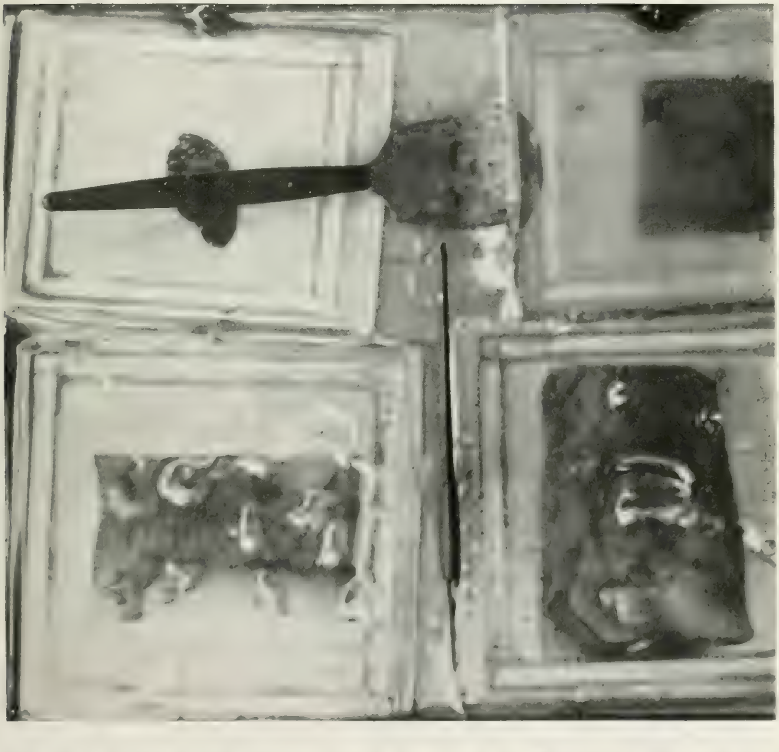

Fig. 7a. Lifting the Mount from the pan of Congealed Kaiserling III. Gelatin.

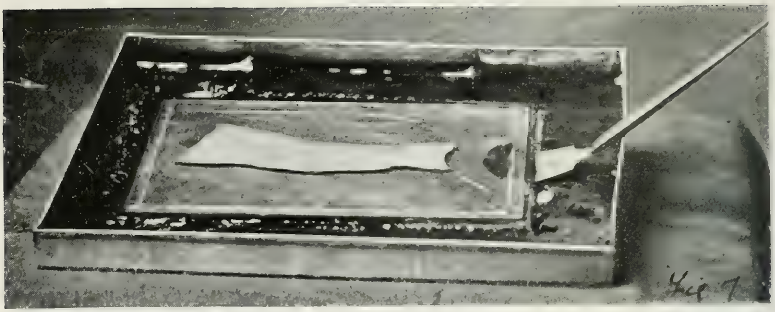

Fig. 7*b*. Showing the Method of Removing the Mount from the Surrounding Congealed and Set Gelatin. *a*, *b*, *c*, and *d* is the Line Along Which a Cut Has Been Made Through the Gelatin.

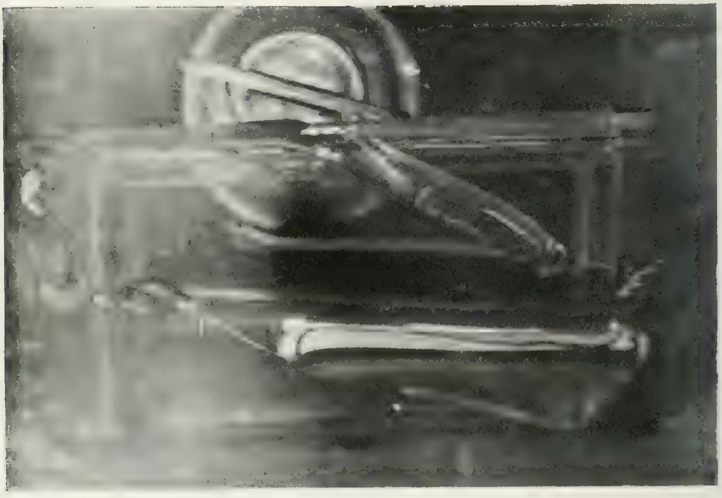

Fig. 7*c*. Shows how the Kaiserling III. Gelatin, After It has Congealed for 48 Hours or Longer, Peels off the Side of the Cover and from the Space Between the Plate.

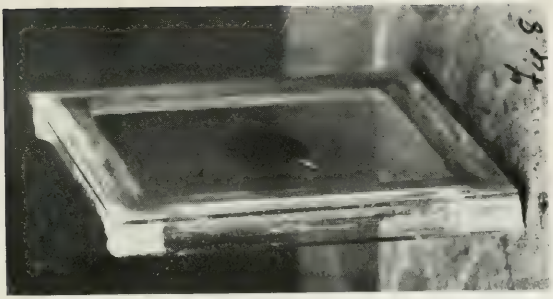

Fig. 8*a*. Showing the Mount with the Gelatin Cleaned Out of the Edges and the Paraffin Plugs in the Corners, the Edges Converted into Troughs.

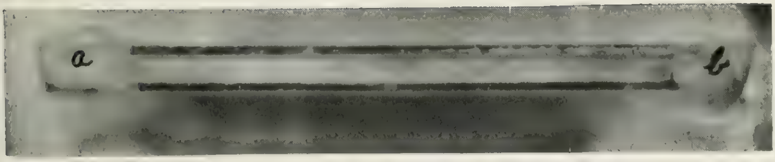

Fig. 8*b*. Showing the Plugs, *a* and *b*, of Paraffin and the Formation of the Trough to be Filled with Paraffin for the Final Sealing of the Mounted Specimen.

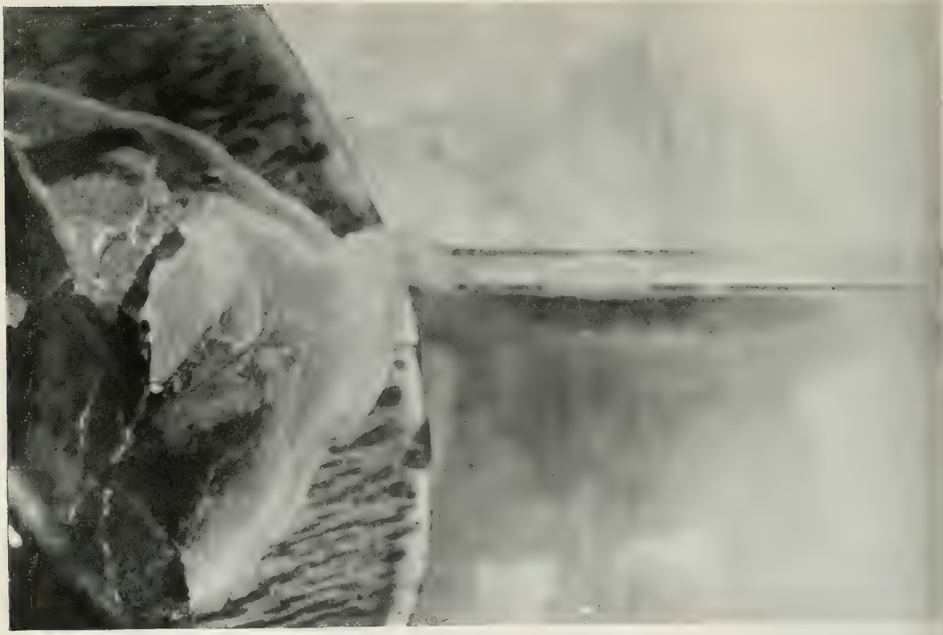

FIG. 9*a*. POURING MELTED PARAFFIN IN THE TROUGH AND SEALING THE MOUNTED SPECIM

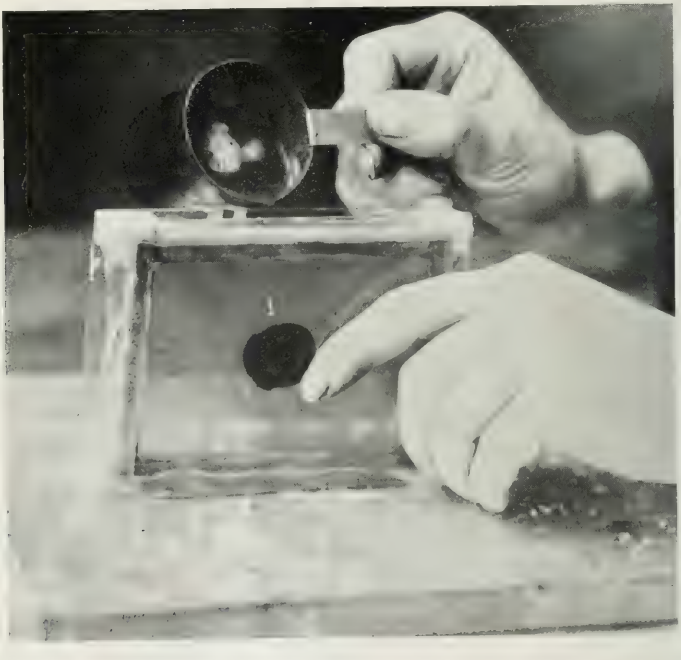

FIG. 9*b* SHOWING THE METHOD OF HOLDING THE MOUNT AND FILLING THE TROUGHED EDGE WITH MELTED PARAFFIN.

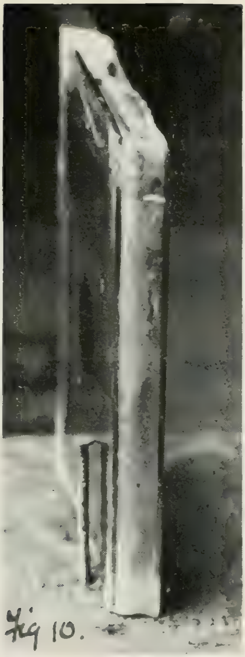

Fig. 10. Showing the Appearance of the Edge After It Has Been Filled with Paraffin and Has Been Smoothed Off with a Heated Spatula.

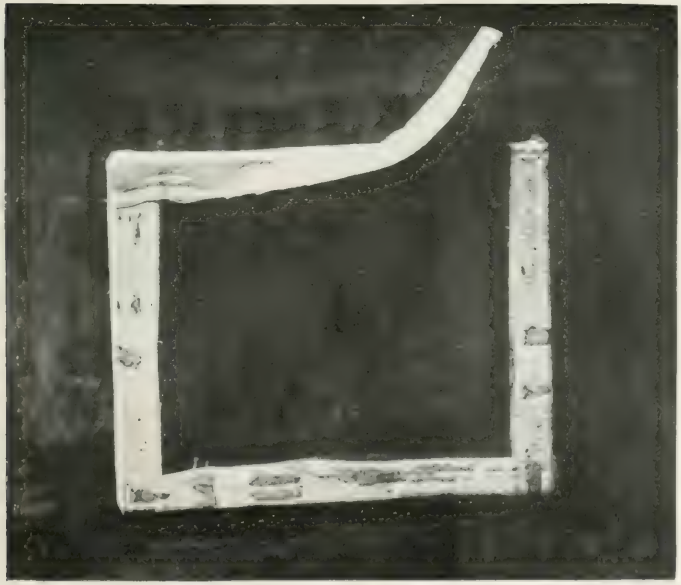

Fig. 11. Showing the Method of Applying and the Appearance of the Edge Protected with a Strip of Surgical Adhesive.

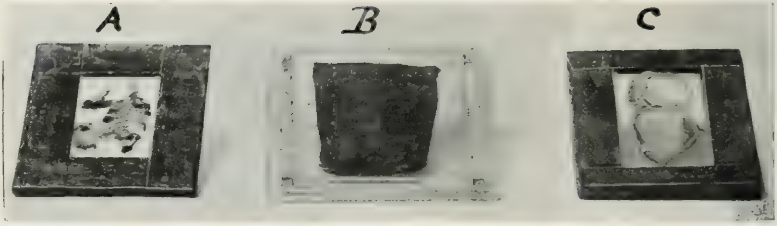

Fig. 12. Showing the Appearance *A* and *C*, of the Finished Mounts After the Black Border Has Been Added, Varnished and Burnished and the Appearance of the Mount, *B*, Before the Adhesive Border Has Been Added.

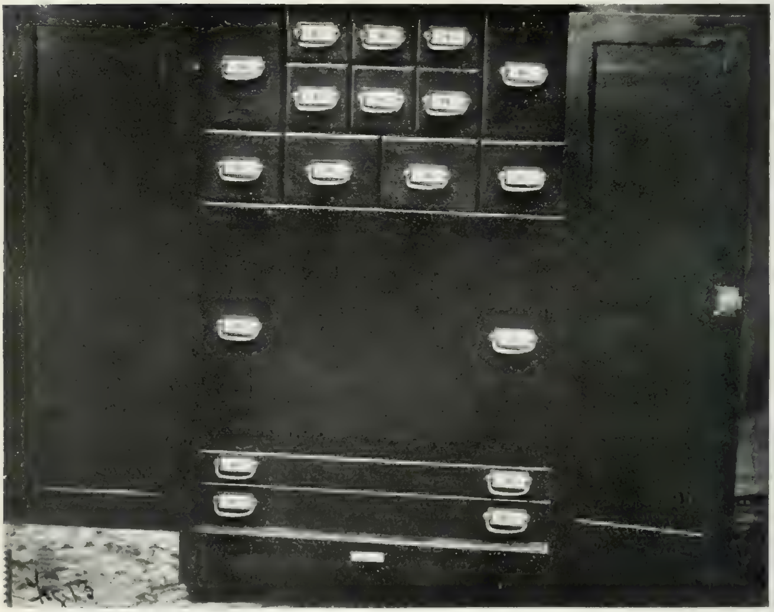

Fig. 13. Showing a Form of Cabinet that may be used for Filing and Preserving the Mounts.

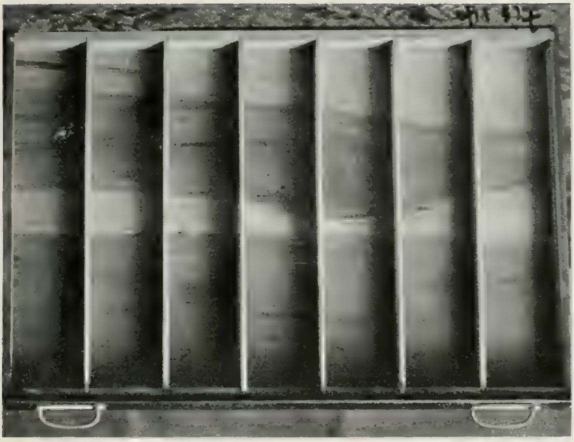

FIG. 14. SHOWING THE DIVISIONS INTO WHICH THE BOTTOM DRAWERS ARE DIVIDED FOR INDEX CARDS, MICROSCOPIC SLIDES AND VERY SMALL MOUNTS.

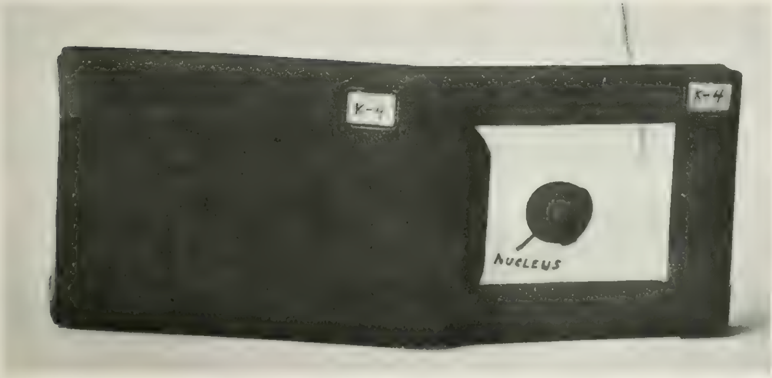

FIG. 15. SHOWING THE MOUNT IN ITS BLACK PAPER ENVELOPE, LABELED FOR FILING IN THE CABINET.

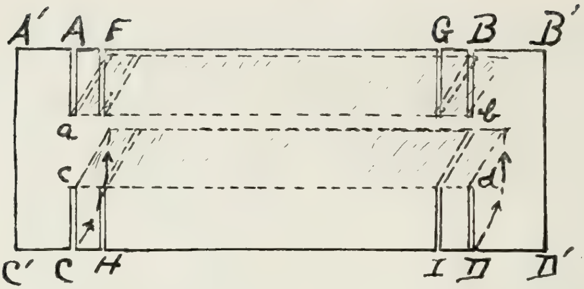

Fig. 16. Showing the Design for Cutting Plates of Aluminum to Form Holders for Smaller Mounts. Cuts are made at *A, B, C* and *D* as indicated. The space between *a* and *c*, and between *b* and *d*. should be a few millimeters more than the thickness of the Mount that is to go into the holder. Small cuts are made at *F, G, H* and *I* for holding the legend card, where such is desired. After these cuts have been made, the piece *Aa Bb* is bent upward along the line *a b*, and likewise the piece *Cc Dd* is bent upward along the line *c d*. The pieces *A′ ACC′* and *BB′ D′D* are allowed to remain flat and thus serve as pedicles to hold the Mount upright.

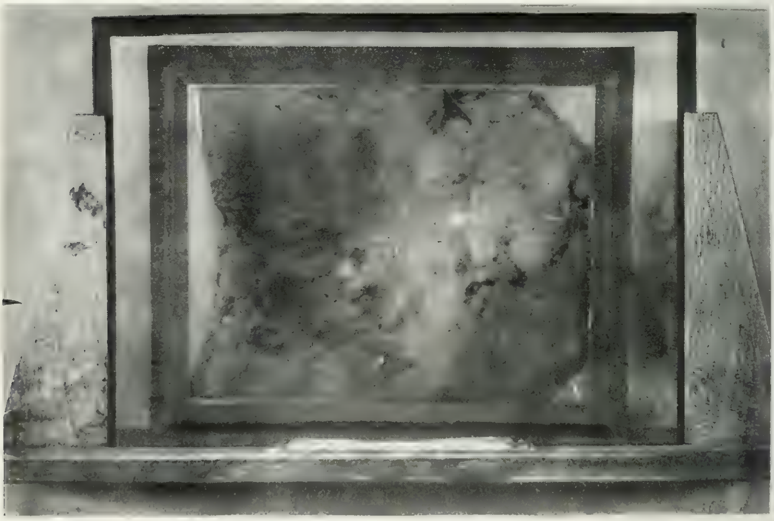

Fig. 17. A Form of Holder that May be Used for Exhibiting the Mounted Specimens.

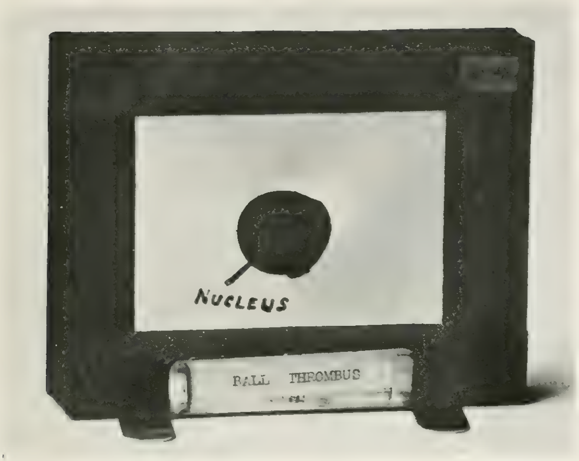

Fig. 18. Showing the Appearance of the Mount in the Holder of the Construction Described Above.

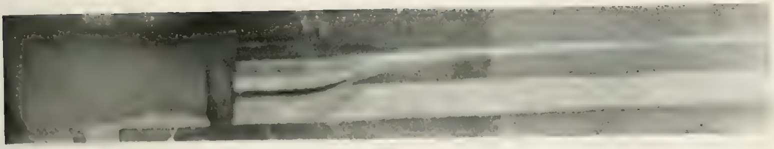

Fig. 19. A Form of Pipette that may be Used for Removing Small Bubbles.

PLACING THE COVER GLASS.

I have found that this is best accomplished by placing one edge of the cover-glass in the fluid outside and near one of the walls of the cell. Then with the finger of the left hand, see Fig. *6a,* pressing down on this edge of the cover-glass, and with the upper edge in the fingers of the right hand, the cover-glass may be slowly placed in position. By pressing the lower portion of its bottom surface against the wall of the cell as a fulcrum the cover-glass may be worked up and down and any small bubbles or small particles that may be on the surface of the gelatin may be gradually worked out. (See Figs. VI, *a, b, c.*)

When the cover-glass is down and there are no bubbles under it the whole mount should be gradually pushed up against the pegs placed on one side and on one end of the pan, so as to get the cover exactly superimposed over the bottom plate. When several small specimens are being mounted in one large pan the covers are first placed in position over each of the specimens separately and in whatever position they chance to fall. When they are all in position and there are no bubbles under any of them, each cover separately can then be moved in a position exactly over the respective bottom plates by pressing on opposite sides simultaneously with two microscopic slides or two clean plates of glass held vertically. The cover-glass should be finally pressed down tight by pressing on the surface with the fingers, in order to remove any excess of gelatin that may be inside of the cell. After the cover-glasses are in position and pressed down, the pan should not be moved for at least 12 hours, till the gelatin has congealed and set. When the gelatin has congealed, the pan should be placed in a cool, dark place and allowed to remain 48 hours undisturbed. It may remain longer without producing any disadvantages or the next step.

PREPARING AND SEALING THE MOUNT.

After the mount has remained submerged in the gelatin in the tin pan in a dark, cool place for at least 48 hours, it may be removed. By cutting the gelatin, (see Figs. 7, *a, b,*) around the edges of the mount and placing a thin spatula or section lifter under one of the edges of the bottom plate, it may be readily lifted from the pan. The gelatin occupying the space between the outer surface of the walls of the cell, the under surface of the cover and the upper surface of the bottom plate, is now peeled out. All of this gelatin should be removed. This can usually be done with a small piece of wood, as a toothpick or match, the end of which has been maccrated into a brush. The surface is then wiped with a clean cloth and dried.

For the final sealing, after the removal of the gelatin from around the edges, I have tried various substances, but so far, none of them have worked so well as the ordinary medium, paraffin. The paraffin is heated to the melting point, say 50° C., and then allowed to cool till a scum forms on the surface. A small quantity of this is then poured into a shallow vessel and from this, while it is still soft, are formed small plugs which are pressed into each of the four corners. Care should be taken that these plugs are quite soft and not hard enough to cause sufficient pressure to push aside the cover-glass and let air into the mount. See Fig. 8. These plugs serve to convert the edges of the mount into small troughs or gutters into which the melted paraffin is now poured, as shown in Fig. 9. The mount should be held upright over a pan to catch any overflow of paraffin till the paraffin in the troughed edge has thoroughly congealed, each edge being filled and allowed to congeal successively after the other till they are all filled. Congealed paraffin that may have collected on the surface of the mount is now scraped away with a sharp knife. Around the edges after the paraffin has congealed there is usually a central depressed groove, due to contraction of the paraffin and more or less unevenness. This groove can be readily filled in and the roughness smoothed off by passing a heated spatula over the edge till the surface is uniform, as shown in Fig. 10. Sometimes there may not be sufficient paraffin on the edges to melt down and fill this groove. In such instances, small pieces of paraffin may be added and gradually melted down and plastered into shape to fill out the deficiency. A thin layer of paraffin should extend over the outer edges of both plates. The two surfaces of the mount should now be well cleaned with xylol and alcohol.

PROTECTING AND ORNAMENTING THE MOUNT.

For protecting the paraffin I place around the edge of the mount a strip of surgical adhesive, pressed down and drawn tight, as shown in Fig. 11. To make this adhesive more durable I paint it over with a layer of rapid drying varnish. I use underlac. The mounting of the specimen may stop here, as specimens mounted as described above are quite as servicable and exhibit quite as much as those which are more profusely ornamented.

However, around the borders of all my specimens covering the adhesive, I place a border of black paper. This I paste on with photographic paste. After the paste is dry, I paint the black border with under-lac, though any rapid drying varnish will serve as well. After the varnish has dried I paint the border with floor wax. When the wax has dried, which requires about one hour, I burnish the border with a woolen cloth. The surface of the mount has now to be cleaned again with alcohol and xylol to remove any particles of varnish that may have collected on it, after which the specimen is ready to be filed away or exhibited, (see Fig. 12,) as may be desired. However, the appearance is quite as good without this second painting of varnish and wax, and some may prefer the dull to the smooth and shining finish to the border.

PRESERVING THE MOUNTS.

For preserving my mounts, I have designed a cabinet as shown in Fig. 13. It consists essentially of an oak box 40 x 26 x 18 inches on rollers and provided with a double floor. This box is divided by partitions and shelves into a number of compartments for drawers of different sizes. The inside measurements of the drawers marked A and B are 8 x 4 x 16 inches, those of drawers C, D, E, F, G and H, are 4.5 x 3.5 inches; those of drawers I, J, K and L are 5.5 x 4.5 inches. Drawer M-N has an inside measurement of 24 x 18 x 16 inches. The inside measurements of drawers O-P and Q-R are 24 x 1.5 x 16 inches. These last two drawers are divided into spaces about 3.5 x 16 inches by narrow strips, as shown in Fig. 14. Each mount is placed in a black paper envelope, as shown in Fig 15, labelled with a number and filed, according to its size, in one of these drawers. An index card bearing the diagnosis and general character of the specimen, the drawer letter and number of the specimen for that drawer is filed in drawer Q-R. Such microscopical slides as there may be are likewise and similarly filed in drawer O-P. These slides bear the letter of the drawer containing the specimen and the number of the specimen.

The size of the cabinet I have described above is, of course, arbitrary. Cabinets much larger or smaller and of entirely different designs may be constructed. A cabinet is not absolutely necessary; the specimen may be placed on the shelves of the museum with the jars where it is so desired and will keep, I believe, except for the liability of a certain amount of fading, fully as well.

EXHIBITION OF THE SPECIMENS.

The most convenient method of exhibiting the smaller specimens is by passing them from one individual to another. However, when it is desired to place them upright where they can be seen and not handled, a very convenient and cheap form of holder can be constructed out of aluminum, as shown in Figures 16 and 17. A strip of aluminum of the desired thickness, width and length is cut as indicated in the diagram. The middle sections are then bent upward around the edge of the mount and the end sections are allowed to remain flat. A card bearing the diagnosis or such legend as may be desired can also be placed on each side as indicated. Various other forms of holders, as frames for large specimens or collections of smaller specimens of the same general character can be readily devised as the conditions may demand (Fig. 17).

Some specimens appear clearer when seen on a dark or colored background. For such specimens a background can be proided by pasting paper of the desired color over one surface. Where it is desired to call particular attention to some part of the specimen, a line or an arrow may be drawn with india ink on the surface of the glass, as shown in Fig. 18.

TROUBLES.

(1) *When the gelatin is too warm and causes the paraffin to melt.* Under this circumstance the paraffin comes to the surface and forms a scum. This scum can be skimmed off with a glass slide. If it is present in the mount it causes an opacity or cloudiness.

(2) *When the gelatin sets or congeals before all the covers are in position* when several are mounted in a single pan. Pour a sufficient quantity of warm gelatin mixed with formalin, as described above, in the pan to form a thin layer over the mounts whose covers are not in position. When the covers are in position this added gelatin may be forced out of the mounts by pressure.

(3) *Bubbles.* When a bubble or bubbles are discovered in the mount after the cover-glass has been placed in position, if the gelatin has not begun to congeal, the cover-glass should be gently raised by placing a thin spatula or section lifter under one edge and inserting a thin capillary pipette into which the bubble can be drawn. (See Fig. 19.) Sometimes a platinum loop works as well, the bubble being then caught in the loop and drawn out.

(4) *When bubbles form along the margin of the mount after warm paraffin is poured around the edge to seal the mount.* This indicates that the gelatin has not set. It has only congealed. With such specimens it is best to remove the cover-glass at once and set the mount aside for 24 hours and then remount by placing it back in the pan and pouring in sufficient fresh gelatin to alow the cover-glass to go back in position without bubbles. Then the pen is placed aside for another 48 hours and the preparing and sealing is tried over again.

(5) *Large bubbles and cracks in the gelatin after the mount has stood for a while.* This indicates that the mount was not perfectly sealed or by some means air has entered the cell and caused the gelatin to dry. The mount is a failure, but not a loss. The adhesive and paraffin can be removed, the cover-glass taken off, the gelatin removed from the specimen, the specimen brightened up in fresh 95% alcohol and Kaiserling III. and mounted over again.

NOTE.—I have recently mounted a number of specimens in glycerin gelatin prepared as recently described by Bruere and Kaufman (3), used in the same manner as the Kaiserling III. gelatin, and find it works admirably. It is to a certain extent clearer than Kaiserling gelatin and so far none of my specimens have liquefied. The gelatin in 48 hours set thoroughly and will not melt when placed over a flame.

I am indebted to Dr. F. F. Wesbrook, of the University of Minnesota for valuable suggestions in perfecting this method to the degree of reliability I now have it, to G. S. Blakeslee & Company for the use of their Meat Slicers and to the Chicago Surgical and Electrical Company for the construction of the cabinet and the holder for the mounted specimens.

St. Joseph's Hospital.

THE USE OF METALLIC AND HARD-RUBBER FRAMES IN MOUNTING TISSUES BETWEEN PLATES OF GLASS. TWO MODELS OF RACKS THAT MAY BE USED FOR EXHIBITING SUCH MOUNTS. ADVANTAGES.*

BY J. H. HEWITT,
Baylor University, Medical School, Dallas, Texas.

The construction of cells out of strips of glass, by the method I have previously described, is a rather tedious and time consuming task. I have found that metallic and hard rubber frames, apparently, serve quite as well and greatly facilitate the process.

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* Read at the fifth stated meeting of the International Association of Medical Museums, Philadelphia, Pa., April, 1912.

I have made a series of mounts with frames, similar to the one shown in Fig. 1, constructed out of brass, aluminium and hard rubber. Some of these mounts have been under observation for six months and they are all as perfect as when first mounted. Such frames have been used for all of the specimens exhibited.

The process for construction of the cell with these frames is as follows.—A vessel large enough to contain the frame is filled with hot melted paraffin to a depth sufficient to cover the frame. Into this hot paraffin the frame is dropped. It is then immediately lifted out with a pair of tongs, of the construction shown in Fig. 1, by catching the frame on either side of the outer borders. Hard rubber frames should remain in the hot paraffin only a few seconds, otherwise they become soft and are bent when caught by the tongs. The glass plate which is to serve as the base should have been cleaned and placed in a convenient position beforehand. On this plate the frame is placed while the paraffin is hot and melted. (See Fig. 2.)

When the paraffin has congealed it will be found that the entire frame is covered with a thin layer of it and that the frame has been cemented to the plate by the congealed paraffin firmly enough to serve the purpose for which it is to be used. To be sure in securing the frame in the exact position desired it is best to place a piece of white paper beneath the glass plate, on which heavy black lines indicate the position on the frame.

I herewith present models of two forms of racks that may be used for holding a number of these mounts and exhibiting them together, Fig. 3 and Fig. 4. These racks can evidently be constructed of any size desired and for any number of specimens desired. The construction is sufficiently simple to be readily understood from the accompanying pictures. With a meat slicer thin slices of a whole consolidated lung or a whole cirrhotic or nut-meg liver may be cut and mounted as readily as the small pieces here presented.

Some of the advantages of specimens mounted by the method I have described are:

I. FILING AND RECORDING.

A small slice of a diseased organ often serves as well as the whole organ to demonstrate the lesion and the general microscopic appearance. It is often difficult and frequently impossible to so accurately describe a pathological appearance that it can be readily recognized or identified from the description in another

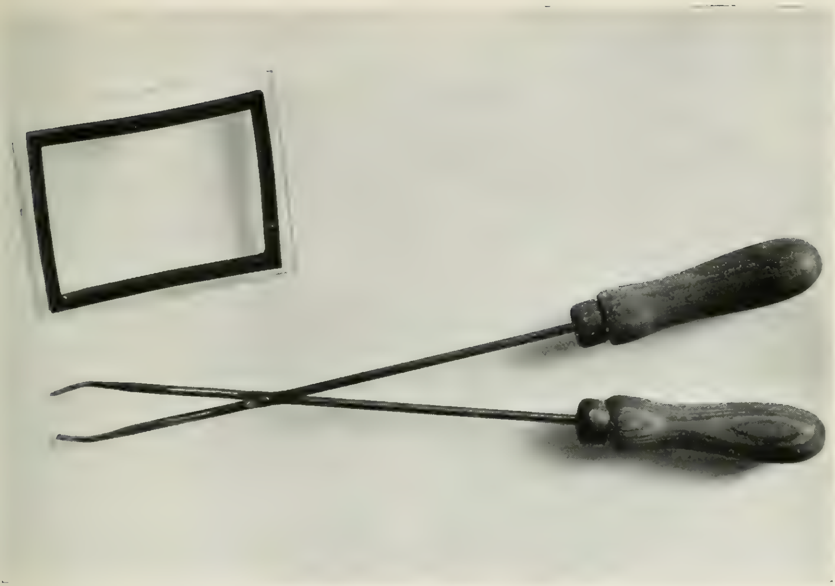

Fig. 1. Long Tongs for Catching Frame Along Outer Border.

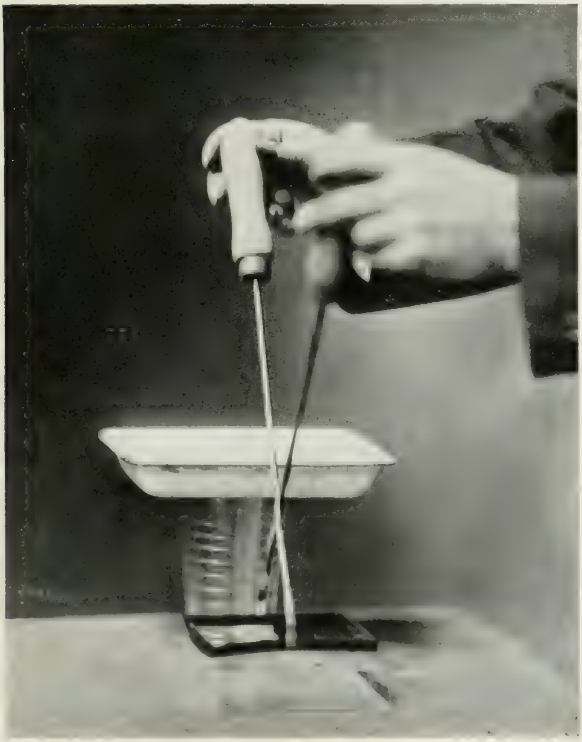

Fig. 2. Glass Plate for Base, Cleaned and Placed in Position.

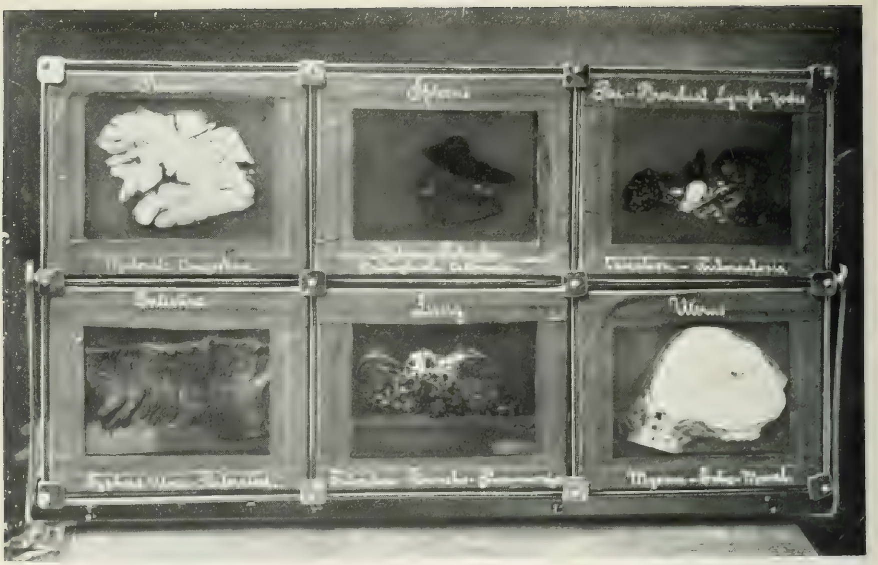

Fig. 3. Steel Rack for Holding a Number of Mounts.

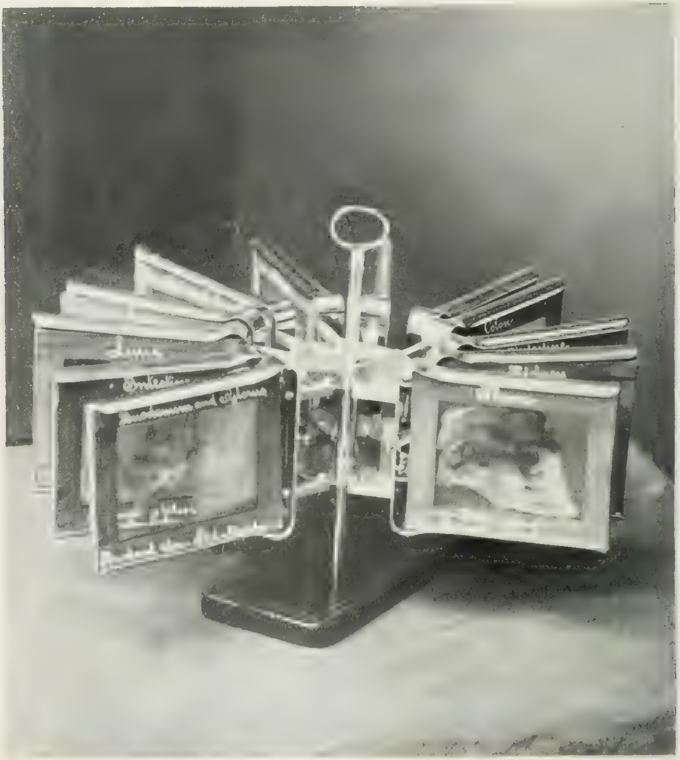

Fig. 4. Steel Racks for Mounts Placed on Central Pivot.

instance or by another observer. By the above method a portion of the lesion can be mounted, filed, indexed and so preserved as to be always at hand for ready reference, demonstration or comparison.

2. TEACHING MORBID ANATOMY.

In a great many of our medical schools, the students seldom see the microscopic lesions which they study so minutely microscopically. The above method furnishes a means by which specimens may be furnished to those institutions which have not the advantages of autopsies, from centres where they are abundant.

According to the general routine of teaching pathology and pathological anatomy the microscopic appearance is described with much more detail than the microscopic appearance and the student spends the greater portion of his time during the course with the microscope. By the above method the two may be carried on side by side. Each student may be provided or, better, furnished the tissue and required to provide for himself, a mounted gross specimen of the more common pathological conditions and, at the same time that he studies the sections microscopically, be afforded the facilities of identifying the structures microscopically. Such teaching must appeal to the inquiring student and will tend to stimulate, I believe, such a method of study in other subjects, a tendency to go back to the original, the real thing, the truth.

3. PUBLIC EXHIBITION AND PUBLIC EDUCATION.

Medical Museums have never been very popular resorts, except for a specialized and interested few. There is so much of the horrible and the unsightly. Slices of pneumonic or tuberculous lungs mounted by the side of a normal lung in frames fixed on easels or swinging racks are certainly more attractive to an ordinary individual than whole organs in heavy glass receptacles, and are indeed, in a general way, more instructive. I can conceive of such a museum built upon such a plan having an appearance somewhat resembling a picture gallery. Such a museum must be inviting and thus form a basis for public education concerning diseases and their causation

A CONVENIENT KAISERLING BATH CABINET.

By H. E. Robertson, M.D.
Associate Professor of Pathology, Institute of Public Health
and Pathology, University of Minnesota,
Minneapolis, Minn.

The cabinet consists of a box 6 ft. long, 31 inches wide, and 6½ inches deep, and set on a table which is 29 inches from the floor. The top is hinged at the bottom and has a strip 2 inches wide nailed along its upper edge so that when the box is closed this strip projects over the top cover. Hooks and eyes placed at each end hold this piece firmly in place. The box is opened by loosening the hooks at ends, dropping the front piece, and raising the top lid opposite each jar, permitting an accurate movable rec-

These containers consist of four vat-shaped glass tanks with sloping sides. They measure 27 x 13 inches at the top, 23 x 9 inches at the bottom, and 6 inches in depth. They are placed securely between cleats nailed along the bottom on each side and can be easily removed by drawing them forward. Each tank is covered by a piece of light sheet rubber, which is bound around the edges by thin strips of wood and is large enough for the wooden binding to just fit over the outside edges of the vat. This gives a fairly tight cover easily manipulated and free from danger of warping. Label holders are fastened on the inside of the top lid opopsite each jar, permitting an accurate movable record of each specimen in each tank as it passes along. In addition each specimen has attached by aluminum wire a fiber tag with the number of the operation or autopsy stamped on it by steel dies.

The first tank contains the Kaiserling I solution. The second and third tanks contain alcohol, one a dirty, weaker alcohol used to remove the Kaiserling I solution, and the other a clean, stronger alcohol to complete the color return. The fourth tank contains the regular Kaiserling III solution, in which specimens may be kept until mounted in appropriate specimen jars.

The advantages of this cabinet are:

1. Specimens are kept in the dark.

2. Specimens may be readily placed in the vats and easily removed from one to the other.

3. Solutions do not evaporate and vats may be easily removed for cleaning.

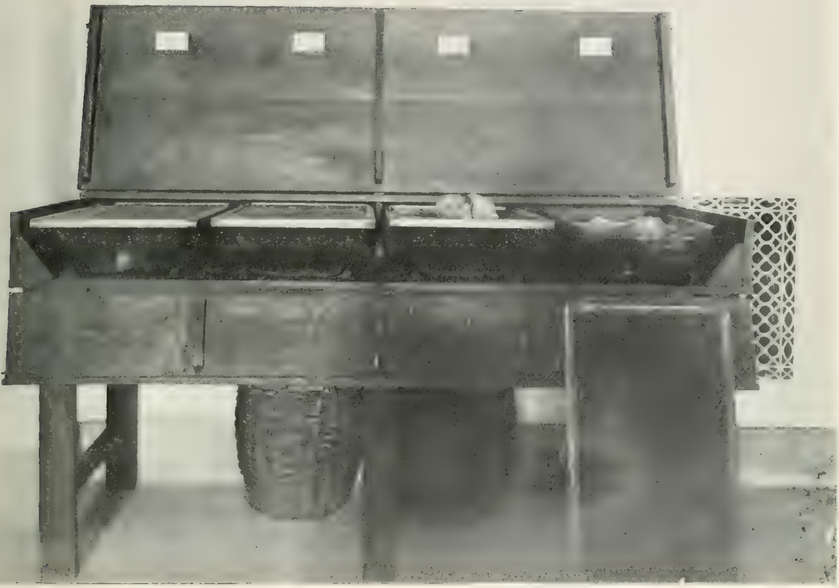

Fig. 1. Kaiserling Cabinet. Open.

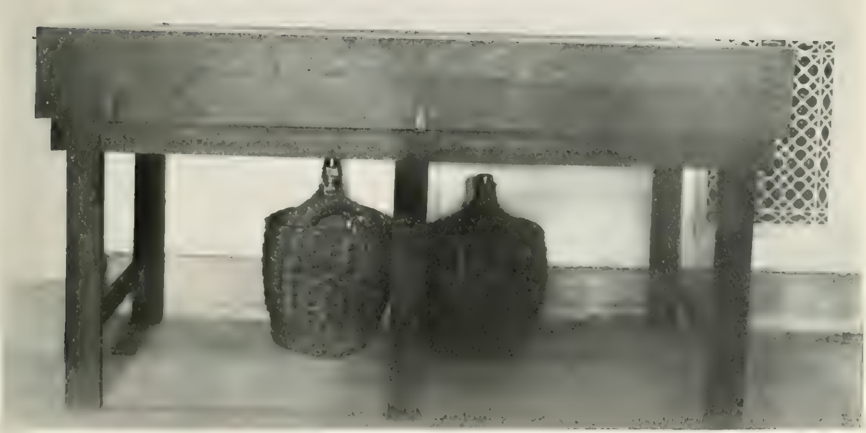

Fig. 2. Kaiserling Cabinet. Closed.

4. The specimens may be examined at any stage of the process with maximum of light and minimum of manipulation.

5. Long flat specimens may be as easily preserved as smaller pieces.

6. The cabinet has a definite position and helps to keep a preparation room neat and clean and free from the various Kaiserling jars and vats which usually clutter up a table or cupboard and have no place of their own.

A NEW AND INEXPENSIVE SOLUTION FOR THE MOUNTING OF MUSEUM SPECIMENS.

By R. L. Frost.

From the Pathological Department, University of Sheffield, England.

The specimens are fixed in the ordinary solutions, Kaiserling, Jores or Pick, as soon as possible after removal from the body. If much handling of the specimen is required, and especially if it has to be washed in water, it has been found advisable to place the specimen for a few seconds in the fixing solution before exposing any cut surface to the air or to water. From the fixing solution the specimens are transferred to fresh methylated spirit, in which they are kept until the natural colours have become well developed.

From the spirit the specimens are transferred directly to the following mounting fluid:

Sodium fluoride	80 grms.
Chloral hydrate	80 grms.
Potassium acetate	160 grms.
Cane Sugar (Tate's cube)	3500 grms.
Saturated thymol water	8000 c.c.

The specimens may be put up directly in this fluid, but it is usually better to leave them in it for about a week and then transfer them to a fresh filtered solution before the final sealing up of the jars.

The colours are not only well preserved in this sugar solution, but during the first week they are rather intensified, and in many specimens where the natural colours have not been well developed in the methylated spirit, they have become much better marked in the sugar solution. Specimens have now been kept in this solution for twelve months, with exposure to direct sunlight and also to ordinary diffused light, and no appreciable loss of colour has taken place, provided that the specimens have been well fixed in the fixing solution.

One of the great advantages of the solution is its cheapness as compared with the glycerin mounting fluid. Specimens which have been mounted in glycerin solution and have lost their original brightness may be placed in the above solution with marked improvement.

AN INEXPENSIVE OIL METHOD FOR MOUNTING.

By Joseph Marshall Flint, M.D., and Carl Kellner.
(From the Surgical Laboratory of Yale University.)

For the past two years, we have used with complete satisfaction a Standard Oil product known as Russian Mineral Oil No. 2 for making permanent museum specimens of our pathological material. The medium is cheaper than glycerine and infinitely superior, as it does not become opaque on standing, nor does it turn acid in reaction with the resultant decolorization of the specimen. The greater stability and the absolute neutrality of the oil not only preserve the optical qualities of the mount, but also prevent the reduction of the blood pigment and a consequent change in the color values of the specimen. While there is always a slight change in the color of the mount after a time, due probably to the action of the light, our oldest specimens, nevertheless, are still in a state of preservation which we have been able to obtain by no other method. A better, clearer grade of oil, known as Russian Mineral Oil No. 1 may also be used with even better results, but we have never felt that the difference justified the greater expense. Both oils may be purchased from the Standard Oil Co. at reasonable figures in barrel lots. The price in smaller quantities is naturally somewhat higher.

The series of steps for the mounting of specimens which has given us the best results is as follows:

Solution 1--

Carlsbad salts	5	gm.
Liquor formaldehydi 40 per cent dilution	5	c.c.
Water	95	c.c.

The length of time that the specimen remains in the fluid depends naturally on its nature and size. We have allowed specimens to fix for varying periods from eighteen hours to seven days, with good results.

Solution 2—

Alcohol	80 per cent.

As a rule a few hours is sufficient in this solution. Prolonged treatment with alcohol decolorizes the specimen.

Solution 3—

Glycerin	50 c.c.
Water	50 c.c.

In placing soft or elastic specimens directly from Solution 1 or from alcohol into pure glycerin, we have noticed a tendency for them to shrink and become distorted. If the dehydration is made more gradual after controlling the color restoration in alcohol the specimens tend to retain their form and original size with a minimum of shrinkage.

Solution 4—

Glycerin	100 per cent.

Specimens are allowed to remain in this bath until they sink, which indicates that the impregnation with glycerin is complete, after which they are ready for transfer to the final preserving oil.

Solution 5—

Russian Mineral Oil No. 2.

The displacement of the glycerin does not take long, but varies with the size of the specimen. The glycerin falls to the bottom of the jar, from which it can be pipetted off, or else the impregnation may take place in a stock jar and the specimen transferred to the permanent museum jar after the oil has replaced the glycerin.

In the preservation of our pathologic surgical specimens we have found that cysts can be fixed with the maintenace of their original form if they are aspirated and filled with the solutions as they are transferred. This is particularly true of thin-walled cysts, making this step particularly important in the transfer into the final preserving oil.

While we have not been able to restore the color to old specimens that have turned brown, their condition has been much improved by the transfer from the glycerin preservative to the oil preservative. Experiments are now under way to determine the effect of the oil preservative on the histologic picture, but it must be obvious that where good histologic sections are desired, pieces should be removed from the original specimen and preserved after fixation in suitable fluids.

THE USE OF OIL AS THE FINAL PRESERVATIVE FOR SPECIMENS, THE NATURAL COLOR OF WHICH IS TO BE RETAINED.*

By Henry Albert,

Professor of Pathology and Bacteriology, University of Iowa, Iowa City, Ia.

All who have used the Kaiserling method of preserving museum specimens in their natural colors, have frequently been disappointed by the lack of color preservation, by clouding of the medium or by growth of moulds on the surface of the fluid. All of these disappointing circumstances may be overcome by the use of an oil as the final preservative. The most satisfactory kind of oil to be used was recently brought to our attention by Flint and Marshall in their article "A New Preservative for Pick-Kaiserling Specimens" in "The Journal of the Amer. Med. Assoc., April 27, 1912, p. 1277." We had previously been experimenting with different kinds of oils, but have since found Russian Mineral Oil No. 2 to be more satisfactory than any other tried. This oil is obtained from the Standard Oil Co., of New York and is less expensive when obtained in barrel lots, than the Kaiserling No. 3 used heretofore.

METHOD OF USE.

(This is the same as that cited in the preceding article by Flint and Marshall and is therefore not repeated here.—"Ed.")

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* Read at the fifth stated meeting of the International Association of Medical Museums, Philadelphia, Pa. 1912.

ADVANTAGES OF THE OIL AS THE FINAL PRESERVATIVE.

1. The color of the specimen is retained regardless of exposure to light (eight months' trial). The color is the same as that of the specimen when first placed in the final Kaiserling preservative and is often that of the natural specimen. The final Kaiserling preparation however, frequently fades owing to the glyerin becoming acid in reaction, although this is largely obviated by keeping the specimens in the dark.

2. The fluid remains clear. The final Kaiserling preservative readily becomes cloudy on exposure to direct sunlight.

3. No bacterial or mouldy growth develops in the oil, as often occurs in the Kaiserling preservative unless some objectionable antiseptic is added. The only objectionable feature to the use of the oil is that specimens kept in it for some time are not as good for microscopic work as when kept in a preservative more suitable for that purpose. This is also true, although to a somewhat less extent, of the final Kaiserling preservative. Whatever material is desired for microscopic work should, of course, be removed from the museum preparation as soon as possible and placed in the appropriate fixatives.

I regard the use of the oil as the final preservative of specimens, as a distinct advance in museum work.

THE TAGGING OF MUSEUM SPECIMENS.

By E. L. Judah,
McGill University, Montreal, Canada.

Equal in importance to the specimen itelf is the reference number which must be attached to each one, which gives the clue to the clinical history and to the Museum notes upon the case. No little difficulty has been experienced in finding a method of tagging or blocking the specimens at the autopsy, owing to the various fluids it has to go through in course of preservation. Metal tags which are sometimes used, rust, and disfigure the specimen, celluloid dissolves in alcohol, and pencil writing on cardboard becomes obliterated and torn off. Probably the best method for immediate use at the autopsy is that recommended by Professor W. G. MacCallum of the College of Physicians and Surgeons, New York. Consecutive numbers are stamped by means of a Bates automatic numbering machine on a length of white tape one inch wide, which is then paraffined and rolled on a stick, the number next in order being cut off and attached to the specimen as required.

The following method of tagging has been in use at McGill Medical Museum for the last eight or nine years, and has given absolute satisfaction. A sheet of Bristol board one mm. thick is cut into blocks 1½ cm. square. Clip off the four corners, write the reference with waterproof ink. Punch a hole as near the centre as possible without interfering with the writing, and boil in a hard paraffin for half an hour. Remove with dissecting forceps, shaking off the superfluous paraffin, and drop into running water. Stitch loosely to the specimen with thread in such a manner that the numbers may be easily read from either side, without danger of bending or breaking the block. The smaller the block, the less danger of damage in handling.

When a specimen is donated to the Pathological Museum of McGill University, it is given a consecutive entry number which is inscribed on one side of these blocks, and on the reverse side of this is put the donor's name or hospital reference. Duplicate tags are attached to every specimen for the sake of security. Specimens thus tagged can go into storage until they are wanted in the Museum.

When a specimen is about to be mounted for the Museum shelves, the tag is re-written with a very fine drawing pen on as small and thin a block of cardboard as possible, and boiled in paraffin as above. When it is removed from the paraffin, the superfluous fluid is rubbed off quickly by the thumb and forefinger. It is then attached to the back of the specimen in an inconspicuous place, with a very fine needle and thread. When this is done the previously attached storage tags can be removed. By this method it will be seen that the specimen is never left without means of identification.

The advantage of this method over the paraffined tape for use in the autopsy room is that the specimen is tagged with both hospital and Museum references. The importance of this was demonstrated at the late disastrous fire at the Medical School of McGill University. All the records having been destroyed and many jars broken, those specimens which were saved could only be identified by means of the hospital reference number on their tags.

In paraffining gummed labels on Museum jars as is often done for the sake of permanency, difficulty is frequently experienced in making the label adhere properly, without presenting blisters or grease spots. The following method of paraffining labels has given good results. Cleanse the jar thoroughly, and give it a coat of shellac before the label is put on. After the label is applied, allow it todry, then paint it over with hot paraffin applied with a small flat paint brush, about one inch wide, taking care that the edges of the label are completely covered with the paraffin. When the specimen is for the Museum shelves, trim the edges to within about ⅛ inch of the margin of the label, removing all superfluous paraffin beyond this point. If the label subsequently gets dusty it can be cleaned by wiping it with a cloth slightly moistened with benzine.

DEMONSTRATION OF BASE OF MUSEUM JARS.

By Henry Albert, Iowa City, Iowa.

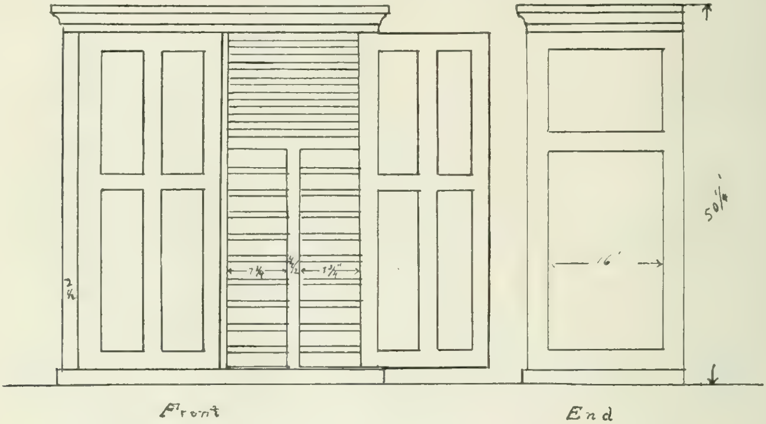
Many museum jars have such a narrow base that slight provocation will cause them to fall over, frequently resulting in a breakage of the jar. We have overcome such deficiency, in a very satisfactory way, by cementing, to the base of the museum jar, a sheet of galvanized iron of varying thickness and other dimensions, according to the size of the jar and the support needed. The length of the sheet should correspond to the width of the ordinary rectangular jars—it being unnecesary to have the sheet project beyond the narrow sides of the jar. The width of the sheet should be such as to extend from three to six, or even more centimeters beyond the flat sides of the jar. For the ordinary shapes, a fair rule to follow is to have the width of the sheet correspond to three times the thickness of the jar. The galvanized iron—even the thickest sheets necessary, may be cut with heavy shears. The corners had better be rounded off. The jar may be cemented to the base with the same material that is used for sealing the covers on the jars. For this purpose, we have for some time used white marine glue (Binney and Smith, New York City). Using such, the base properly shaped, is heated by means of a bunsen burner; the glue previously liquefied by being heated in an iron ladle, is poured along the middle (lengthwise) one-third of the sheet, and the jar pressed into place. The excess of glue which is squeezed out, is best removed as soon as it gets quite firm, but before it becomes thoroughly hard.

SLIDE CABINET FOR STORAGE OF LARGE NUMBERS OF SLIDES.

By O. Klotz,
Professor of Pathology, University of Pittsburgh,
Pittsburgh, Pa.

The following suggestion is only a modification of that given by Tyzzer* some few years ago. We have tried out his scheme of filing our slides in the style of the card-index systems and believe it is the most useful yet devised.

Essentially the cabinet is built of a system of drawers which are of good strength and of proper measurements to contain the ordinary 3 x 1 inch slide. The drawers are of two types, an upper series of flat trays in which are stored the recently prepared slides, and the lower series which permit two rows of slides to be packed permanently on edge. Slides are not placed in the lower drawers until thoroughly dry. The upper trays are also used for the storage of such slides as can never be placed in the card-index system (specimens mounted in glycerin). As Tyzzer suggests, the various series of slides which are stored may be marked by small projecting card markers. We have found that to have a combination cabinet which permits the orderly storage of the freshly mounted slides, as well as cases for the permanent storage of large numbers of slides, is of great advantage. For hospital and school laboratories it adds greatly to the equipment.



Slide Cabinet for Storage of Large Number of Slides.

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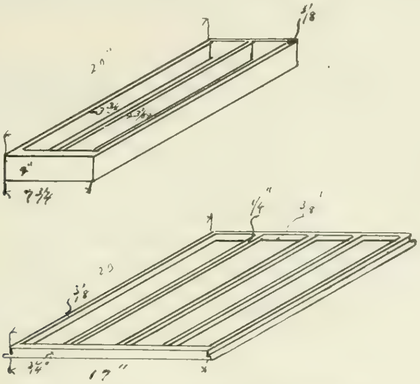
* Tyzzer . . . Journal Medical Research, 1907, XVI, p. 219.

The cabinet here described is built of stout oak and will store from thirty to forty thousand slides. We have now three of these cabinets in use. Such a cabinet would likewise serve very well for museum collections.



Top—Plan of Lower Drawers.
Bottom—Plan of Upper Drawers.

EXPERIENCE DEPARTMENT

The first Experience Circular of this Association *"On the Preservation of Natural Colors in Museum Specimens"* was issued to members in Jan., 1910. It brought a remarkably good response, and the seventeen replies received from widely different sources formed when published in Bulletin No. III, a very valuable compendium of actual experience. The interest elicited both in these replies as here published, and in the symposium upon these which took place at the Chicago meeting of the Association in 1911, was so great as to invite a second enquiry along somewhat different lines. The subject of "Difficulties in special points of histological technique" was suggested by Professor Pearce, and questions on this topic were invited from members with the result given below. Only a limited response has so far come in, and further replies are requested. These will form the basis of a symposium which will form part of the programme at the next meeting of this Association, to take place in London, England, August 6th to 13th, 1913.

EXPERIENCE CIRCULAR NO. 2.

Enquiries made by:

Prof. J. G. Adami, McGill University, Montreal, Canada.
Prof. Sabin, Baltimore, Md.
Prof. S. B. Wolbach, Harvard Medical School.
Prof. Poujol, Algiers.
Prof. Streeter, Ann Arbor, Mich.
Prof. Louis B. Wilson, Rochester, Minn.
Prof. A. S. Warthin, Ann Arbor, Mich.
Dr. Réné Sand, Brussels, Belgium.
Prof. J. C. Simpson, McGill University, Montreal, Canada.
Prof. W. G. MacCallum, New York.
Dr. Sprunt, Baltimore, Md.
Dr. Winternitz, Baltimore, Md.
Prof. Pearce, Philadelphia, Pa.
Mr. Charles F. Silvester, Princeton, N. J.
Prof G. Carl Huber, Ann Arbor, Mich.

ENQUIRY.

A.

On Histological Technique.

1. Give suggestions as to the best method of storing and filing histological specimens in the Medical Museum.
   Prof. Adami, McGill University.
2. State with details, the methods of staining which you have found to afford the most permanent histological preparations.
   Prof. Adami, McGill University.
3. What are the best methods of clarifying embryoes for microscopic study by oil of wintergreen and benzol?
   Prof. Sabin, Baltimore, Md.

Methods of Embedding.

4. What are the best methods for softening chitinous structures of insects and larvae preparatory to embedding and sectioning?
   Prof. S. B. Wolbach, Harvard Medical School.
5. Which of the solvents—xylol, chloroform, cedar-oil, methylol, acetone—is preferred for dissolving paraffin in the paraffin method of embedding?
   Prof. Poujol, Algiers.
6. State method of paraffin embedding for Weigert's nerve stain.
   Prof. Streeter, Ann Arbor, Mich.

Methods of Staining.

7. What are the best methods of staining fresh tissues for diagnostic purposes?
   Prof. Louis B. Wilson, Rochester, Minn.
8. State improved methods of staining spirochaetes in tissues.
   Prof. Warthin, Ann Arbor, Mich.
9. How to obtain Van Gieson's preparations without rapid loss of coloration, or Mallory's with well stained nuclei.
   Dr. Rene Sand, Brussels, Belgium.
10. To find a constant method for staining glia tissue. Weigert's, Mallory's, Benda's are very capricious.
   Dr. Rene Sand, Brussels, Belgium.

11. What is the best method for the demonstration of the intracellular canaliculi (trophospongium) in nerve and gland cells?
Prof. J. C. Simpson, McGill University.

12. To find a specific stain for Cholesterin esters.
Prof. W. G. MacCallum, New York.

Special Problems.

13. Microchemical reaction in tissues. What are the best means of showing the iron reaction, calcium salts, fats, &c., in tissues, and what are the difficulties encountered?
Dr. Sprunt, Baltimore, Md.

14. Vital staining of tissues. State method of injection used and the best way to preserve such tissues by section methods for finer study; what difficulties arise and what are the problems to the study of which this method is adapted?
Dr. Winternitz, Baltimore, Md.

15. Living tissues. Give experience of those working on the growth of living tissues in blood plasma and other fluids, with especial reference to the examining and staining of cultures as prepared by the methods of Harrison, Burroughs and Carrel.
Prof. Pearce, Philadelphia, Pa.

B.

MISCELLANEOUS ENQUIRIES.

16. What are the best means of mounting delicate material without tearing?
Mr. Charles F. Silvester, Princeton, N. J.

17. What have you found to be the best methods of maceration?
Prof. Huber, Ann Arbor, Mich.

18. The best method of distending for Museum purposes hollow structures which have already been cut into.
Prof. W. G. MacCallum, New York.

19. The best method of fixing on the tops of square Museum jars.
Prof. W. G. MacCallum, New York.

REPLIES.

Replies were received from the following sources:

Question 2. Best method of staining permanent histological preparations. *Reply:* Georgine Luden v. Heumen, M.D.

Question 5. Best solvent for paraffin. *Replies:* Georgine Luden v. Heumen, M.D., Herbert U. Williams, M.D.

Question 6. Paraffin embedding for Weigert's nerve stain. *Reply:* Georgine Luden v. Heumen, M.D.

Question 7. Staining fresh tissues. *Reply:* Louis B. Wilson, M.D.

Question 15. Vital staining of tissues. *Reply:* R. A. Lambert, M.D.

Question 16. To mount delicate material. *Replies:* F. A. Izzard, and E. L. Judah.

Question 17. Methods of maceration. *Replies:* F. A. Izzard, and E. L. Judah.

Question 18. To distend hollow structures. *Replies:* F. A. Izzard, and E. L. Judah.

Question 19. Cement for sealing square Museum jars. *Replies:* William Coburn, M.D., William Muir, and E. L. Judah.

As these replies will form the material for the Symposium on this Experience Circular at the Meeting of the Association on Auust 6th next, they are reserved for publication in the next Bulletin, which will be devoted to the proceedings of that Meeting.

Meantime the attention of Members is again drawn to the above enquiries with the earnest request that they reply to any questions on which they may have personal experience. All communications to be addressed to the Secretary of the Association at McGill University, Montreal.

DEPARTMENT OF EXCHANGES

One of the most important functions of this Association is the development of an international system of exchange of Museum specimens and pathological material for microscopic investigation. This exchange is conducted by means of correspondence, a circular letter being sent out from time to time by the Secretary, requesting a statement of material wanted and material offered in exchange, and the announcements received in reply being published in the succeeding Bulletin, or made in the intervals of publication by means of a printed circular. Up to this time the response received from foreign members has been good, and some important exchanges have been transacted. Nevertheless the activity of the exchange is still much below its possibilities, and the further success of the Department will depend both on an increased interest on the part of members volunteering their needs, and on the prompt transmission of their communications through the Secretary to those quarters where they will be most likely to receive attention. Arrangements have been made whereby a more active correspondence can be carried on, and members are urged on their part to a freer and more frequent use of the Department. Those members receiving material in response to requests made through the Bulletin, are especially requested to inform the Secretary of the fact, in order that no further effort may be made, and that the exchange may be reported in the succeeding Bulletin.

Conditions of Exchange:

1. Requests or offers of material may be made to the Secretary by whom they will be circulated.
2. The exchange may be transacted either through the Secretary or directly between the giver and the recipient. Before any material is sent to any applicant he must be notified of the intention of the proposed donor, in case his request has already been granted by some other member of the Association. If the material offered in exchange by the recipient of a given specimen is not such as is needed by the donor, the latter is requested to communicate his need to the Secretary, who will make a special effort to obtain, through correspondence as well as through the columns of the Bulletin, his particular need.

3. The cost of transportation is in all cases to be paid by the institution receiving the material transported.
4. If the specimens are very small, they may be sent by post. Large specimens should be transported, not in individual glass jars, but in bulk, wrapped in moist wool or cheesecloth, and packed in soldered tin or other water-tight receptacle.
5. Each specimen should be tagged with its reference number.
6. The nature of the specimen and, where possible, a brief history of the case, should be forwarded to the recipient.

Exchanges Reported:

As a result of the announcements made in Bulletin No. 3, exchanges have been participated in between the following Institutions and individuals: Harvard Medical School, Prof. S. B. Wolbach; Pathological Department of the City Hospital, Rotterdam, Holland, Prof. de Josselin de Jong; Pathological Institute of the School of Medicine, Cairo, Egypt, Prof. Alex. Ferguson; the Senckenberg Institute, Frankfurt-on-Main, Prof. B. Fischer; University of Iowa, Prof. Henry Albert; Wiener Allgemeiner Krankenhaus, Prof. Oskar Stoerck; Cooper Medical College Museum, San Francisco, Cal., Prof. W. Ophüls; Bender Hygienic Laboratory, Prof. Thos. Ordway; McGill University, Montreal, Canada, Profs. J. G. Adami, J. L. Todd; Royal Victoria Hospital, Montreal, Prof. A. A. Bruere; Pathological Department, University of Birmingham, J. Sholto Douglas; Commune Hospital, Copenhagen, Denmark, Dr. Victor Scheel.

EXCHANGES PROPOSED.

Prof. J. G. Adami, Drs. Maude E. Abbott and Joseph Kaufmann, McGill University, Montreal, Canada.

Requests:

Monstrosities, embryoes in all stages; anomalies of the heart; intestinal parasites, especially Taenia Soleum; parathyroids.

Prof. Henry Albert, University of Iowa, Iowa City, Ia., U. S. A.

Requests:

Tumours of the eye, especially of the cornea.

Dr. F. W. E. Burnham, Winnipeg, Man.

Requests:

Stained blood films showing parasites, or pathological blood conditions.

Prof. Oswaldo de Cruz, Institute de Manguinhos, Rio de Janeiro, Brazil.

Requests:

Spleen from Kala-azar.

Offered in Exchange:

Spleen from Blastomycosis.

Prof. Van Duyse, Ghent, Belgium.

Requests:

Fixed fragments of tumours of the orbit, and tumours of the salivary glands.

Offered in Exchange:

Portion from tumour from region of lachrymal gland (endothéliome hyalogène tubulös).

Prof. Alex. Ferguson, Pathological Laboratory, Government School of Medicine, Cairo, Egypt.

Requests:

Blood films containing phases of any malarial parasites, of any of the species of Trypanosomes.

Blood, spleen, or liver films from Leishmaniosis in infants or young children.

Films from scrapings of Oriental Sore from various parts of the world.

Offered in Exchange:

Bilharzias of urinary bladder (microscopic material).
Bilharzias of colon (microscopic and macroscopic):
Bilharzial cirrhosis of liver (microscopic and macroscopic).

Prof. B. Fischer, Senckenberg Institute, Frankfort-on-Main.

Requests:

Anatomical specimens of malarial diseases, plague, smallpox.

Dr. O. C. Gruner, Royal Victoria Hospital, Montreal, Canada.

Requests:

Spleen and lymph glands in leukaemia, Hodgkin's disease, and sarcoma.

Dr. R. de Josselin de Jong, Rotterdam, Holland.

Requests:

Spleen from morbus Banti, kala-azar, granuloma.

Offered in Exchange:

Different varieties of cirrhosis of liver.

Prof. W. G. MacCallum, College of Physicians & Surgeons, New York, N. Y.

Requests:

Bone, and other tissues in cases of infantile scorbutus. Tissue from sclerema infantum.

Offered in Exchange:

Parathyroids; tertiary syphilitic lesions.

Prof. Marie and Dr. Gustave Roussy, Faculté de Médecine de Paris.

Requests:

Haemorrhages; Ramollissements; Lacunes; Etat vermoulu du cerveau; Lacunes de la protuberance; Ramollissements du vervelet; Moelles de tabes; Poumons avec lesions seniles; infarctus du myocarde; Atherome aortique très prononcé; Rachin dans le mal de Pott (coupes sagittales au Kaiserling); Perisplenite des vieillards.

Prof. G. Poujol, Faculté de Médecine, Algiers, Algeria.

Offered in Exchange:

"Lympho sarcome du cou chez un très jeune enfant dont l'examen microscopique a révélé une forme de sarcome très intèressante et que je crois non encore décrite."

Dr. Lawrence J. Rhea, Harvard Medical School, Boston, Mass.

Requests:

Tissue from the liver in cases of congenital obliteration of the bile ducts.

Offered in Exchange:

Tissues from generalized blastomycosis of the lung fixed in Zenker's fluid for microscopic examination.

Dr. Réné Sand, 45 Rue des Minimes, Brussels, Belgium.

Requests:

Fragments for microscopic study from all affections of bones; joints; skin; glands with internal secretion; salivary glands; pancreas; testicle; all somewhat rare affections.

Offered in Exchange:

Linitis plastica of stomach; central nervous system, kidney and heart of a case of interruption of circulation during one hour (chloroform syncope) with death 8 days afterwards; Chloroma; peritoneal diffuse endothelioma; diffuse melanotic sarcoma of meninges; diffuse endothelioma of spinal meninges; systematic combined degeneration of the spinal cord; acute chorea; embryoma of the retroperitoneal space; adenosarcoma of the kidney.

(All fragments for microscopic study.)

Dr. Chas. F. Silvester, Dept. of Comparative Anatomy, Princeton, New Jersey, U. S. A.

Requests:

Offered in Exchange:

Hearts of South American monkeys.

Dr. Oskar Stoerck, Pathologisch-Anatomische Institute, Vienna, Austria.

Requests:

Coccidiosis; Amoebic dysentery; Bilharziosis.

Prof. R. P. Strong, Dept., Tropical Medicine, Harvard Medical School, Boston, Mass.

Requests:

Any material from Bacillary dysentery; amoebic dysentery; balantidial dysentery; kala-azar dysentery; lesions of sprue, tongue, mouth , stomach, intestines; Asiatic cholera; yellow fever; leprosy; Beriberi, heart and pericardium; liver with amoebic and also trematodal infection; lung with amoebic and also trematodal infection; Malta fever spleen; bubonic plague all lesions; malaria all lesions; black water fever, kidneys; yaws; trypanosomiasis slides; Kala-azar all lesions; ulcerating granuloma of the pudendum; epidemic gangrenous rectitis; tropical sloughing, phagedaena; gangosa; Oriental sore (Delhi boil) Ainhum; elephantiasis, filaria; bilharzia infection particularly rectum and bladder; paragonomiasis, lungs and other organs infected; distomiasis, liver and other organs; uncinariasis, intestines and other organs; mycetoma (Madura foot); pellagra; tinea imbricta (skin).

Prof. J. L. Todd, McGill University, Montreal, Canada.

Requests:

Kala-azar; all material both gross and microscopical. Slides of *Aleppo Boil.* Slaty spleen in malaria; microscopic slides showing thrombosis of capillaries, brain or other organs by malarial parasites. Slides of smallpox and vaccine bodies. Slides of Negri bodies of rabies. Slides of Trachoma bodies. Balantidium coli. Adult worm Taenia Echinococcus. Paragonium Westermanii. All material from Bilharzia haematobia. All material from Schistosomum cattoi. Slide and muscle of Trichina spiralis. Adult worm of filaria loa. Adult worm of bancrofti. Adult worm of perstans. Adult worm and larvae of F. volvulus. Strongyloides. Porocephalus. Thrombidia. Conorhinus sanguisuga. All ticks and biting insects important as parasites in North America.

Offered in Exchange:

Glossina palpalis, (Tsetse flies). Ornithodoros moubata (human ticks). Slides of spirochetes.

REPORTS

REPORT OF THE FOURTH MEETING

OF THE

INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS

Held in the Auditorium Hotel, Chicago, April 13, 1911.

The meeting was called to order by the President, Dr. A. S. Warthin of Ann Arbor, Michigan.

Thirty-five were in attendance at the meeting, among these being Professor Hektoen, Professor E. R. LeCount, Professor Weaver, and Professor Wells of the University of Chicago; Professor Zeit, Northwestern Medical School; Professor Albert, University of Iowa; Professor Woolley, University of Cincinnati; Professor Mackenzie, University of Toronto; Professor Pearce, University of Pennsylvania; Professor Duval, Dr. Fraser Gurd, and Dr. Couret, Tulane University; Dr. Louis Wilson, Rochester, Minn.; Dr. Downey Harris, St. Louis, Mo.; Professor Bartlett, Yale; Dr. Rhea, Montreal; Dr. Robertson, Minneapolis, Minn.; Dr. Thomas, and others.

Transaction of Business.

The minutes of the last meeting held in Washington May 3rd and 4th, 1910, were read and confirmed. The report of the Secretary-Treasurer was read by Dr. Warthin in the absence of Dr. Abbott, and was accepted by the meeting. The following new members were elected: Prof. B. Fischer, Senckenberg Institute, Frankfort-on-Main; Prof. H. E. Robertson, Associate Professor of Pathology, Institute of Public Health and Bacteriology, University of Minnesota, Minneapolis; Prof. J. C. Simpson, Associate Professor of Histology and Embryology, and Dr. E. Hamilton White, McGill University, Montreal; Dr. O. C. Gruner, Pathologist to the Royal Victoria Hospital, Montreal; Dr. Douglas Symmers, Carnegie Laboratory, New York; Dr. C. H. Higgins, Biological Laboratories, Department of Public Health, Ottawa.

The place and time of the meeting of the Association was then discussed, and it was moved by Prof. LeCount, seconded and unanimously carried, that the regular meetings of the Association be held on the day preceding the annual meetings of the Association of Pathologists and Bacteriologists. As the meeting for next year is to be held in Philadelphia on the Friday and Saturday before Easter, the next meeting of this Association will be held in that city on the Thursday before Easter. Prof. LeCount also moved that a special committee be appointed to co-operate with the Association of Pathologists and Bacteriologists in the preparation of the exhibit of specimens illustrating papers read at the meeting of the Pathologists and Bacteriologists. A general discussion of this motion followed, and it seemed to be the unanimous opinion that this association could co-operate with the Association of Pathologists and Bacteriologists by arranging to have such exhibits put up on the day before the meeting of the latter association and to be kept in place during the Friday and Saturday meetings of that association in connection with whatever exhibits the International Association of Medical Museums should provide. This was unanimously carried. A motion was also brought before the meeting asking that the International Association of Medical Museums investigate the matter of obtaining pathological material from the various government bureaus, and that the committee in the Association of Pathologists and Bacteriologists appointed to take up this work be transferred to this Associatino, Dr. Warthin being named as chairman, with Dr. Pearce of Philadelphia, Dr. Williams of Buffalo, and Dr. Maude Abbott as members of this committee. The following programme was then carried out:

PART I.

PAPERS.

1. President's Address.—A. S. Warthin, Ann Arbor.

Discussed by several members who emphasized the value of the Association and the great importance of the work it was attempting to carry out. One point strongly emphasized was that this Association should also take up questions relating to academic and didactic matters concerning the teaching of pathology. Inasmuch as the Association of Pathologists and Bacteriologists confines itself to purely scientific papers relating to investigations or observations of pathologic conditions, there exists a great need for some avenue of discussion of questions concerning the teaching of pathology, as well as the preparation of pathological specimens and museum methods. The general sentiment of the meeting was that such discussions concerning teaching and didactic methods could best be carried out in this Association.

2. The Teaching of Experimental Pathology and Pathologic Physiology to Large Classes.*—R. M. Pearce, Philadelphia.

   Discussed by Dr. Rhea and others.

3. The Advantages of Mounted Microscopic Preparations in Teaching.—Fraser B. Gurd, New Orleans.

Discussed by Drs. Robertson, Wells, Duval, Woolley, LeCount, Pearce, and Warthin. These discussions related to individual experience in methods of laboratory teaching, there being a decided difference of opinion as to whether mounted or unmounted microscopic preparations should be used in teaching, both methods claiming certain advantages. Dr. Warthin gave in detail the molasses plate method used at the University of Michigan, by which large sheets of sections can easily be prepared and given out to the students, stained or unstained.

4. The Need of a Medical Historical Museum.—Davina Waterson, Baltimore.

Discussed by Drs. LeCount, Pearce, Woolley, Hektoen, Weaver, Harris, Warthin, and others, all of these members expressing their belief in the need of the preservation of local historical material. The Association was asked to co-operate with the various medical historical societies existing in the country and to make a special appeal to the medical profession at large for the preservation of local historical matter. It was thought that a committee should be appointed to work up this side of the function of this Association, and on motion of Dr. Pearce, Miss Davina Waterson was made chairman of such a committee.

5. The Importance of Concentration in Museum Collections.—L. B. Wilson, Rochester, Minn.

6. A Method of Mounting Thin and Membranous Tissues and Thin Slices of Organs in Kaiserling III Gelatine Between Plates of Glass.—J. H. Hewitt, Macon, Georgia.

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* Published. Johns Hopkins Hosp. Bull. XXII, No. 249, Nov., 1911.

7. Some Experiences in Museum-building and Classification of Specimens.—Dr. E. R. LeCount, Chicago.

Discussed by Drs. Albert, Wells, Woolley, and Warthin, each man giving in detail his special methods of museum classification and preparation.

PART II.

SYMPOSIUM DISCUSSION OF THE EXPERIENCE BULLETIN ON THE PRESERVATION OF MUSEUM SPECIMENS IN THEIR NATURAL COLORS.

An informal discussion on the contributions made in Bulletin No. 3, by Prof. Fibiger of Copenhagen, Prof. Pick of Berlin, Prof. de Josselin de Jong of Rotterdam, Prof. Marie and Dr. Roussy of Paris, Dr. Lamb of Washington, Dr. Ordway of Albany, Prof. Albert of Iowa University, Prof. Warthin of the University of Michigan, Prof. Robertson of the University of Minnesota, Dr. Higgins of Ottawa, Prof. McFarland, of Philadelphia, Prof. Pearce of the University of Pennsylvania, Prof. Mackenzie of the University of Toronto, Dr. Gruner of Montreal, Prof. Ophüls of San Francisco, Dr. Kaufmann and Mr. Judah of McGill University.

This discussion was taken part in by Drs. Wells, Albert, Robertson, Rhea, LeCount, Pearce, and Warthin. Dr. Wells suggested the use of sodium fluoride. Dr. Albert gave the results of Pick's method, stating that he had secured no better results than by the use of this method. Dr. Robertson asked information upon the subject of clouding of gelatine. He was answered by Dr. Rhea of Montreal. The question of the action of ferments, liquefaction, the mixture of formol in the Kaiserling III solution, and the prevention of moulds by the use of the alcoholic solution of thymol were all discussed, the general import of the discussion being practially the same as that of the experience bulletin, that the Kaiserling method, as originally given, is the best, but is far from being an ideal method and there is need of further work along this line.

DEMONSTRATIONS.

1. Demonstration of Kaiserling Bath Apparatus.—Dr. H. E. Robertson, Minneapolis.
2. Generalized Blastomycosis.—Dr. L. J. Rhea, Montreal.
3. Demonstration of Base for Museum Jars.—Dr. H. Albert, Iowa City.

4. Demonstration of Method Described in Paper.—Dr. J. H. Hewitt, Macon, Georgia.

Copies of Bulletin No. 3 were distributed at the meeting.

At the close of the meeting an informal discussion was held as to the objects of the Association, and much enthusiasm was expressed over the meeting, the majority of those present expressing great appreciation of the importance of the field of work being done by the Association.

REPORT OF MEETING OF BRITISH PATHOLOGISTS, MAY, 1911.

A meeting of British Pathologists interested in Medical Museum work was held on May 13th, 1911, at 2:30 P. M., for the purpose of receiving information upon the organization known as The International Association of Medical Museums, and with a view to extending the membership and general usefulness of this body in Great Britain. The meeting was called by Dr. Osler, Regius Professor of Medicine at Oxford University and was held at the Royal College of Surgeons, London, by the courtesy and invitation of the President and Council of the College. Sir Jonathan Hutchinson occupied the Chair. Dr. Maude Abbott of Montreal, Canada, Secretary-Treasurer of the Association, was present, with a report upon the origin, aims, and activities of the Association. There was present also Dr. Arthur Keith, Curator of the Royal College of Surgeons Museum, Drs. Andrewes, Hugh Thursfield and A. S. Woodwark, of St. Bartholomew's Hospital; Drs. R. A. Bashford, Imperial Cancer Research. Alfred Gossage and Braxton Hicks, Westminster Hospital; R. I. Trevor, St. George's Hospital; Hubert M. Turnbull, London Hospital; Barnard H. Spilsbury, St. Mary's Hospital; E. M. Paine and E. M. Kettle, Cancer Hospital Research Institute; Kenneth Goadley, National Dental Hospital; J. Walker Hall of Bristol; J. M. Beattie, of the University of Sheffield, and others.

Dr. Osler explained that the object of the meeting was to receive information from the Secretary upon the Association, and also to arrange for a meeting to be held in London in conjunction with the International Congress of Medicine in 1913.

Sir Jonathan Hutchinson introduced the Secretary, who then addressed the meeting. The International Association of Medical Museums had its origin in 1899 in a suggestion of the late Professor Wyatt Johnston of McGill University that an Association of Medical Museum Curators should be formed. This proposal was made by the McGill Museum to the Army Medical Museum, Washington, D. C., but action was not taken until 1906, when the matter was again brought forward at the suggestion of Dr. D. S. Lamb.

With the co-operation of the late Major James Carroll, Curator of the Army Medical Museum it was decided to organize an Association which should be international in scope, and which should have as its object the development of an active department for the interchange of Museum specimens and material for research, the elevation of the Medical Museum as a teaching medium, and the improvement of Museum technique by the discussion of methods. A constitution was drawn up, an organizing Committee formed consisting of Dr. Carroll as Chairman, Professor W. G. McCallum of Baltimore, A. S. Warthin of Ann Arbor, F. F. Wesbrook of Minnesota and Dr. Maude Abbott, as Secretary and an invitation to membership was extended to leading Pathologists throughout the world. So active and warm was the response elicited that it was evident a real need for such an Association existed. Since then four annual meetings had been held, an active exchange department had been inaugurated and also an experience department for the interchange of information on points of Museum interest, and a yearly bulletin containing full report of proceedings has been published. The membership had rapidly increased and now includes representatives in Africa, Australia, South America, as well as in the principal countries in Europe and North America. The latest step had been the organization of local European centres under the control of a Corresponding Member in France, Germany, Holland and Belgium, through which exchanges were to be transacted locally, and the election of suitable members proposed. It was desirable that this step should also be taken in England, especially in view of the proposed meeting here in 1913.

Sir Jonathan Hutchinson said that this organization had his entire sympathy as providing a link between Museum workers that was much needed, especially for purposes of exchange. He thought it important that local centres should be established where duplicate material could if necessary be stored, and an adequate journal should be published. For this purpose funds would be needed in order that the work might be carried on on a scale larger than the membership fees would allow. He strongly recommended that an appeal should at once be made to a suitable quarter.

Dr. Keith dwelt upon the importance of this Association to workers in Medical Museums and expressed his sympathy with it, and his willingness to assist it forward in every possible way. It was to be remembered however that a new Association however needed must be made to bear lightly upon its members, there being already several Societies to which Medical men in England must belong. The provisions of the Constitution, that the annual membership fee should be small (eight shillings), that the meetings should take place but once annually and be held if possible in conjunction with the meetings of some other international medical body were therefore wisely ordained.

After some general discussion, the following resolutions were passed:

(1) That after the arrangements for the meeting of the International Congress of Medicine in London in 1913 are completed, steps shall be taken to arrange for a meeting of the International Association of Medical Museums in conjunction with this Congress.

(2) That the three great English Medical Societies namely, The Pathological Society of Great Britain and Ireland, the Anatomical Society, and the Royal Society of Medicine, be made cognizant of the actions of the International Association of Medical Museums, and that co-operation with these societies be attempted, with special reference to the publication in their journals of the Department of Exchanges, as well as announcements and short reports of meetings.

(3) That one or more correspondents in London be appointed to act as Local Secretaries—Dr. Kettle of the Cancer Research Hospital was named.

All those present who were not already members submitted their names for election to the Association.

REPORT OF THE FIFTH STATED MEETING OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

The fifth stated meeting of the Association took place in Room 264 of the New Medical Laboratories, University of Pennsylvania, Philadelphia, Pa., on Tuesday afternoon, April 4th, and Wednesday morning, April 5th, 1912, in conjunction with the meeting of the American Association of Pathologists and Bacteriologists. The President, Prof. A. S. Warthin, occupied the Chair. Some forty-five members were in attendance.

The following business was transacted:

CHANGES IN THE CONSTITUTION.*

Owing to the growing membership and increasing complexity of relations of the Association, certain changes had become necessary. The following recommendations from the Council were therefore placed before the meeting, discussed, voted upon and carried.

Article III. Membership Fees. Resolved: That the date of the fiscal year be changed from May to January, the next membership fee being payable in advance on January 1st, 1913, *instead of on May 1st,* 1912, *as at present.*

This alteration was made as a matter of convenience in the collection of fees, at the request of the Secretary. By the deferring of the next fee from May 1st to January 1st, 1913, members are given the benefit of the change of date while the Secretary is allowed to collect fees strictly in advance from this time on without unduly billing the members.

Article IV. Election of Officers. Resolved: That the election of Officers shall be triennial and not annual, the next election to take place at the meeting in 1913.

In view of the fact that the business of the Association is conducted between distant points, and is therefore of slow development, and that it is carried on chiefly by the President and Secretary, it is to the interest of the Association that the election of officers shall be not annual, but triennial. This was the original intention of the Organizing Committee, as stated in their organizing circular, but the word annual was substituted for triennial at the first regular meeting, when the Constitution was framed.

Article V. Meetings shall be held annually at the time and place decided upon by the Executive Committee. Resolved, That the following clause be added: *Every third year the meeting shall be held at a time and place accessible to foreign members, and shall be of an international character, and at this meeting the triennial election of officers shall take place.*

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* For the original Constitution see Bulletin No. II.

Article VI. The written vote may be taken in the interim of the meetings by the Secretary, the matter submitted to be decided by a two-thirds majority vote. Resolved, That this Clause be altered to read—*a two-thirds majority of those voting,* it being found impossible to obtain a two-thirds majority vote of all members in writing, as a certain proportion fail to reply.

Secretary-Treasurer's Report.

The following is an abstract of the Treasurer's Report, which was declared audited and approved.

Receipts.

To balance on hand March 14th, 1911	$ 79.08
Membership fees, March 14th, 1911, to April 14th, 1912	240.32
Interest in Bank	1.18
	$320.58

Disbursements.

To printing of Bulletin No. 3, Errata slips for Bulletin No. 3, and programmes for this meeting	$165.16	
To typewriting, stationery, stamps, discount cheques and sundries	38.29	203.45
Balance on hand		$117.13

The Secretary's Report dealt chiefly with the extension of the Association as an international body by the development of local European centres and the growth of the foreign membership. An important step had been the organization of a German *"Verein zum Austausch Anatomischer Praeparate"* at Frankfurt-on-Main under the directorship of Professor B. Fischer, as a branch and integral part of this Association. In addition to the establishment of an Exchange system in Germany in direct connection with the *Deutsche Pathologische Gesellschaft* this Verein had made an important departure in the establishment of a central Bureau for the preservation of microscopical material showing the results of original research. In May, 1911, a visit in the interest of the Association had been made by the Secretary to the Museums and Hospitals of Paris, Holland, Belgium and England, which had resulted in the organization of local centres in these countries, and in the reception of a large number of new names for election to membership. On May 13th, 1911, a meeting of British pathologists had been called by Sir William Osler and Professor Arthur Keith at the Royal College of Surgeons Museum, London, to meet the Secretary with a view to obtaining information about the aims and progress of the Association. Much interest was evinced, and a suggestion was made that the meeting of 1913 be held in London in conjunction with the International Congress of Medicine.

OTHER BUSINESS.

A letter was read from Professor Arthur Keith promising his co-operation in the proposed meeting of 1913. It was resolved: *That the next regular meeting of this Association be held in London in August,* 1913, *at the same time as the meeting of the International Congress of Medicine, and that no effort be spared to make this meeting a success. To this end especial care shall be given to the preparation of the next Bulletins of the Association; that the lowest estimate obtainable for the printing of these Bulletins shall be accepted, but if the funds in hand be not sufficient for the expenditure involved in publication, the Secretary be authorized to approach the members for additional contributions.*

A discussion took place upon the necessity of the reorganization of the Association from an international standpoint. It was felt that its rapid growth and increasing complexity of relations, together with the progress made during the past year in the formation of local European centres, have made it evident that this Association must now be internationally organized under a Congress President and Congress Secretary, while the membership in the United States and Canada should form, as in other countries, a local American section. It was therefore moved by Professor Robertson, seconded by Professor Warthin, and carried, *That a Committee consisting of the Council be appointed to consider the question of the organization of a local American Section under the International body, and that this Committee shall report at a special business meeting of the Association to be held at Washington next Spring, on the day preceding the Meeting of the Association of Pathologists and Bacteriologists, the results of this meeting to be acted upon at the regular meeting in London in August,* 1913.

Professor Arthur Keith, Curator of the Royal College of Surgeons, London, England, was unanimously elected Honorary President of the Association for the London meeting.

Dr. Joseph Kaufmann, McGill University, was elected Assistant Secretary-Treasurer of the Association.

As a result of the discussion on a paper by Professor Leo Loeb (see Programme page ??), it was resolved and carried: *That a Committee of three be appointed by the Chair to take into consideration the advisability of establishing a Central Museum on this Continent, for the preservation of microscopical material showing the results of medical research, this Committee to report at the business meeting of the Association to be held at Washington, D. C., in May,* 1913. The Committee named consisted of the President and Secretary with Dr. Loeb as Chairman.

ELECTION OF MEMBERS.

The following new members were elected at this meeting: Prof. Stiénon, University of Brussels; Prof. Duyse, University of Ghent; Prof. Pirket, University of Liege; Prof. Dr. Poujol, University of Algiers; Dr. G. Y. Rusk, Hearst Laboratory, University of California; Dr. E. T. Bell, University of Minnesota; Prof. Herbert Williams, University of Buffalo; Prof. R. L. Thompson, St. Louis University.

The following new members were reported as having been elected by the written vote taken on January 1st, 1912: Prof. Landouzy, Paris; M. Ménétrier, Paris; Prof. Letulle, Hospital Boucicault, Paris; Dr. Edouard Rist, Hospital Laennec, Paris; Mme. Déjèrine-Klumpke, La Salpètriere, Paris; Prof. Petit, Alfort; Prof. Alezais, Marseilles; Prof. Curtis, Lille; Prof. Max Borst, München, Germany; Prof. Pietro Guizzeto, Parma; Prof. A. Bonome, Padua. Italy; Prof. R. A. Reddingius, Groningen; Prof. Spronck, Utrecht; Prof. Bolk and Prof. Hugo de Vries, Amsterdam, Holland; Dr. Réné Sand, Brussels, Belgium; Prof. Fujinami, Kioto, Japan; Dr. F. W. Andrewes, Dr. A. S. Woodwark, Dr. Hugo Thursfield, St. Bartholomew's Hospital, London; Prof. Lorrain Smith, Prof. Eliot Smith, Manchester; Prof. Sheridan Delepine, Manchester; Dr. A. G. Gibson, Oxford; Dr. E. A. Bashford, Dr. Braxton Hicks, Dr. R. I. Trevor, Dr. Hubert Turnbull, Dr. Bernard H. Spilsbury, Dr. M. Paine, Dr. E. H. Kettle, Mr. Kenneth Goadby, London; Dr. J. M. Beattie, University of Sheffield; Prof. Greenfield, University of Edinburgh; Mr. Wade, Royal College of Surgeons, Edinburgh; Dr. John H. Teacher, Hunterian Museum, Glasgow; Prof. A. E. Mettam, Dublin; Dr. J. L. Robinson, Waco, Texas; Dr. Lindsay S. Milne, New York; Dr. C. J. Bartlett, Yale University; Dr. D. L. Harris, St. Louis, Mo.; Dr. Leonard W. Williams, Harvard Medical School; Dr. F. J. White, Moncton, N. B.; Dr. F. W. E. Burnham, Winnipeg, Man.; Dr. Eugene L. Opie, St. Louis, Mo.

The following programme was successfully carried out:

PART I.

Papers and Demonstrations.

1. On the Technique for the dissection of cases of Fracture of the Vertebrae.—Prof. H. Chiari, Strassburg.

The technique described was briefly as follows: (1) The injured spine is first exposed, and observed both anteriorly and posteriorly to see if there be a fracture, dislocation, or combination of these. (2) The site of injury itself is next exposed and the two or three affected vertebrae are loosened above and below, and are removed with the corresponding piece of spinal cord, *en masse,* for further investigation. (3) Then open the canal in the rest of the spinal column in the usual way, and remove the remaining cord above and below the injury. Now with a long, narrow knife separate and remove the injured piece of cord from its vertebrae, and place the three pieces of cord, *i. e.,* the injured portion and that from the spinal column above and below it together and carefully examine them. Do not make sections immediately through the cord but place aside over night in 10 per cent formalin. (4) The separate vertebrae are now carefully cleaned and dissected, and in this state are compared with corresponding macerated normal specimens, all details of the injury being noted.

Two cases examined in this way were reported, one involving the cervical and the other the dorsal vertebrae. (For full article see Strassburger Med. Zeitung. 1908, No. 8.)

2. The Ideal Museum.—Prof. H. E. Robertson, Minnesota. Published on page 12 of this Bulletin.

3. On the Formation of a Central Museum in this Country where Microscopical Specimens of Importance Demonstrating the Results of Scientific Investigation could be kept ready for Exchange.—Prof. Leo Loeb, St. Louis, Mo.

A discussion followed, in which the importance of the proposed Central Bureau for North America was emphasized, and a resolution was passed naming a committee to consist of the

President, and Secretary, with Prof. Loeb as Chairman, to consider the organization of this Bureau, and to report at the Washington meeting.

4. Interchangeable Charts for Museum and Demonstration Work.—Prof. Joseph McFarland, Medico-Chirurgical College of Philadelphia, Pa.

5. The Museum in Medical Teaching.—Dr. Maude E. Abbott, McGill University, Montreal.

This paper dealt with the possibilities of the Medical Museum as a teaching medium both by the employment of carefully graded series of specimens illustrating all degrees in a given pathological process, and also by the correlation that might be attempted between clinical and pathological facts and microscopical findings by the demonstration of the specimens together with the elucidation of points in the clinical history of the case bearing upon these, and thê microscopical appearances.

Such a correlation of facts had been carried out remarkably in the Clinical Museum of Sir Jonathan Hutchinson at the Post Graduate School, London, and also in the popular Museum at Hazlemere in Surrey, organized by this great leader in Museum work. In its application to medical teaching the careful cataloging of the specimen both as regards the pathological conditions present, and the clinical facts recorded, together with the presentation of all clinical data pertaining to it, such as photographs, pulse-tracings, etc., was essential. Treated from this broad standpoint Museum teaching covers a wide field, and can be made of immense use to the student as the link needed between his work at the bed-side and at the autopsy. In the Medical Museum at McGill University an attempt was made to carry out this idea by means of serial demonstrations to small groups of students, and also by a form of descriptive exercises to the individual student in which he himself makes a comparative study of the variations in an individual lesion in five or six type specimens allotted.

Dr. H. E. Robertson enquired as to the method of preservation of Museum records, and how these could be made accessible both to the individual in charge, and to those using the Museum for study and reference.

Dr. Abbott replied that in the Medical Museum of McGill University a double system of records was kept. Every specimen on being received is given a consecutive entry number in the accession book, and under this number all data obtained with it are filed under the accession number of the specimen in a loose entry sheet which is sent to the donor in acknowledging the receipt of the specimen, with a request for clinical and pathological data. In the case of a private donor, the information returned on the entry sheet is usually sufficiently full. In specimens from the hospitals it is generally necessary to send a student, who is paid a small sum by the hour, to fill in the entry sheet from the hospital records. When filled out in this way the entry sheets are filed under the accession number of the specimen in a loose leaf file. From the data thus obtained those specimens added to the Museum shelves are catalogued, only the essential clinical, and pathological data being taken from the entry sheet, to secure brevity in the printed catalogue, and the file of the original entry sheets in addition to the catalogue, being at all times accessible to the student if more definite information be desired. In cataloguing the following definite order is followed: (1) Catalogue number. (2) Pathological description of specimen. (3) Clinical history. (4) Brief statement of post mortem findings of interest other than those shown in the specimen itself. (5) Reference. (6) Donor.

The specimens on the Museum shelves are more scientifically and accurately catalogued than would otherwise be possible by a system of collaboration with the different clinical and pathological workers on the Medical Teaching Staff, who undertake to work over the specimens on a given section in which they have expert knowledge, and after describing these, writing a short didactic introduction upon them.

6. Demonstration of Simple Apparatus for Anaesthesia by Insufflation for Use in Class Work.—Dr. A. B. Eisenbrey, University of Pennsylvania.

Discussed by Dr. Cobbett, who showed a machine for the same purpose, a modification of the Fischer apparatus for the administration of ether anaesthesia. The chief provided with a safety apparatus of much use in laboratory anaesthesia which must often be entrusted to a man without special training.

7. A New and Inexpensive Solution for the Mounting of Museum Specimens.—Mr. R. L. Frost, Pathological Department, University of Sheffield, England.

(Published on page 41 of this Bulletin.)

8. A Library Museum in Medicine.—Dr. Thomas Ordway, Harvard Medical School.

In early times, museums and libraries had a unity of interest and were often included under one roof. A division of labor in all departments has necessarily led to a separation, and hence the establishment of museums of art and science, including the medical museum. The general medical museum is very apt to be regarded by the laity as a "chamber of horrors," and is often of little value not only in the general scheme of public education but even in medical school teaching. Departmental collections are valuable adjuncts to teaching, but could be made much more useful by proper cataloguing and correlation with the collections of other departments and the general museum.

The proposed library-museum should afford not only convenient storage facilities for gross specimens, but secure co-operation in medical school teaching, research and public service. It should contain drawings, photographs, lantern slides, microscopic preparations and all means available for teaching and serve to bridge over the gap between the present library and museum.

A "library-museum committee" in which the various departments of the medical school are represented, should have general charge, although the active administration could be delegated to the curator and his assistants.

At the outset, such departmental collections might be left intact though there should be a *general* catalogue in the central museum. It should be the aim of the curator to lessen the restrictions in clientele and in the specimens to be loaned, as it is seen that the privileges of the museum are not abused.

Such an active museum should be of value not only in the medical school teaching and research, but to the people more directly in the work of public service.

PART II.

SYMPOSIUM ON THE VALUE OF EXHIBITS ILLUSTRATING OCCUPATIONAL DISEASES.

The discussion was opened by Prof. A. S. Warthin of Ann Arbor, who spoke as follows:

The value of exhibits illustrating occupational diseases came to me last year as the result of practical work done by me in

Michigan. About a year ago, I was asked by the Board of Health and the Governor of Michigan to make a preliminary investigation as to the character of industrial diseases found in that state, in order that an estimate might be made of the possible number of cases, so as to decide whether a more elaborate investigation should be carried on later. The Governor's interest in the subject was due to the spread of socialistic tendencies in Michigan. A modified socialism has made great advances among the people at large, that is to say, people are afraid to call themselves Socialists, but socialistic tendencies are growing. In our State, a large number of bills have been introduced into the Legislature for the purpose of improving the industrial conditions and protecting workingmen.

The result of this preliminary investigation was the calling of an extra session of the Legislature and the passing of the Workingmen's Pension Bill, which had failed the year before, but which is now a law. In making this investigation I not only had the fortune to find the usual industrial diseases, so-called, but I also discovered a number of conditions not recorded at all, or that occur in other forms of industry elsewhere. One of these is perforation of the nasal septum in salt-workers. The Shaker Salt is made in Michigan; and in these great salt factories a large number of girls (in one, over a hundred) are engaged in a single room, filling the packages with the salt, for ten hours a day. The girls work in a bent-over position, in a constant atmosphere of fine salt-dust. A large number of the one hundred girls in the particular room that I have mentioned have had perforation of the nasal septum. It was painless. The affection begins with an increased bloody catarrh, and very soon they have a large, round, clean-cut perforation of the nasal septum. The only thing like it that I have found in the literature is the so-called chrome perforation in Germany. We have not investigated any other salt factories, in order to learn whether this condition exists elsewhere; but I have found no record of it in industrial literature.

In the copper mines, we found a peculiar affection of the miners. In the deep shafts of the Tamarack Mine, over one thousand feet below the surface, there is an affection called miners' cramp, which affects only the miners called trammers. The temperature is very high at this level, and these men push heavy trams, and consequently perspire profusely, so that they are constantly bathed in perspiration. Under these conditions, these men are subject to a very painful affection of the muscles, which affect any group of muscles as a frightful muscular cramp. The pain is excruciating, and the suffering of the miner is very marked. Almost the only thing that controls it being morphine. So far as other symptoms are concerned, none have been observed in the other stages, and no metabolic study of these cases has been made. Only one fatal case is on record, and this was in a man who had had six hundred attacks of this affection. The causation is obscure; it cannot be due to the depth, the increased atmospheric pressure, or the heat, because the other miners who are not "trammers" do not have this painful cramp. It is only the men that sweat profusely through exerting themselves a great deal in the heat, who have it. The symptoms are exactly like those described by Edsall in persons exposed to furnace heat, and he was unable to make out the exact cause of the condition. At first he thought it might be due to gas intoxication; and later, he was inclined to consider it the result of radiant heat. This cannot be the case in these miners, it must be due to some change in general metabolism—to loss of salts and fluids, combined with overwork of the muscles.

These are only two of the new and interesting forms of industrial diseases that we discovered. There were others.

The report of this investigation was given before a convention of local health officers, which meets twice a year and keeps its members in touch with scientific work. The result was that a great deal of interest in occupational diseases was aroused; and since that time, I have had constant visitors coming to Ann Arbor to see material on lead poisoning and other occupational diseases.

In States where Socialistic tendencies are advancing and where labor laws are being developed, especially where such a law as that providing for compensation for injury to employees has been passed, an education museum illustrating the subject of occupational diseases becomes a necessity. We have in this country nothing to compare with the ones they have abroad, particularly the one at Buda-Pesth, where all the occupational diseases are illustrated by correlated exhibits. There for instance, the subject of lead poisoning is taken up in three rooms. In one, all the details of the white-lead industry, glazing, pottery, the making of storage batteries, various forms of painting, the making of colors, and all the other various trades in which lead poisoning may occur, are shown. In the next room are the dirty clothes of the worker, and models of the laborers with the dust on their hands, as well as the dinner pail covered with dust, and the laborer using his pipe or cigar in the shop. In the third room are seen results. The empty cradle, showing the result of the abortion of women who work in the pottery mills, and the malformations of the new-born, particularly those of the head; other features in the pathology are shown in casts or specimens, the wrist-drop, the atrophy of the muscles, the blue line, the interstitial nephritis, and all the other conditions that we recognize as due to lead-poisoning.

In my own State, a museum could be made up by the occupational diseases among miners. We have the miner's knee, the miner's elbow, the miner's wrist, deafness, anthracosis, painful cramps and a number of other conditions common in that work in the mines. We also have a peculiar disease called the "Smith Mine Affection," in which boils occur in persons who work in water at certain levels. Then there is the possibility that the miner may be infected with the hook-worm. The bothriocephalus has been introduced by the Finns. I have had fifty cases of this in Finns, and also several indigenous cases. We have found the measle in fish in the inlet of Lake Superior, in that region.

My suggestion is that in States where industrial education is taken up, there should be a popular museum in connection with the State University, which is the main educational centre and factor. The exhibits should be correlated, showing all the factors in the etiology, the common factor in the life of the workers, and also the pathology and prevention. I am convinced of the great importance of this, so far as my own State is concerned; and we have started to work out this problem there. There is a great deal of sympathy with the movement, and we have an increasing influx of visitors at the State University who ask for these exhibits. This shows how the popular mind is going, and we must meet that necessity, I think."

Prof. LeCount of Chicago, and Prof. Oskar Klotz (Pittsburgh) also spoke at length. Among other industrial diseases Dr. Klotz mentioned anthracosis and infection with B. aerogenes capsulatus as being very common among the coal miners of Pittsburgh.

PART III.

Exhibitions and Demonstrations.

An interesting series of exhibits, chiefly of Animal Parasites, were given by Drs. A. J. Smith, University of Pennsylvania, D. L. Harris, St. Louis, Mo., C. W. Duval, New Orleans, La., A. S. Warthin, Ann Arbor, Mich., F. W. E. Burnham, Winnipeg, Man., J. H. Hewitt, Chicago, Ill., J. L. Todd, Joseph Kaufmann, and E. L. Judah, McGill University, Montreal. These exhibits were displayed in a room adjoining that in which the meetings of the Association were held, and remained open for the three days, April 4th, 5th, and 6th, for the inspection of the American Association of Pathologists and Bacteriologists (meeting April 5th and 6th) as well as for the members of the International Association of Medical Museums.

REPORT OF MEETING OF MEMBERS RESIDENT IN AMERICA, MAY, 1913.

A business meeting of the members of this Association resident in America was held at the Army Medical School, Washington, D. C., on Monday, May 5th, 1913. The President, Prof. A. S. Warthin, of Ann Arbor, Mich., occupied the Chair. The meeting was called in accordance with a resolution passed at the last Annual Meeting with the following objects:

1. To discuss the organization of a local American section under the International Body, and the perfecting of the organization of the Association as a whole on the International basis, the plan of action formulated to be submitted to the consideration of the coming International Meeting at London.

2. To make preparations for the coming Triennial International Meeting to be held in London, England, August 6th to 13th next, in conjunction with the XVIIth International Congress of Medicine.

3. To receive a report from the Committee upon the organization of a Central Bureau for North America for the preservation of results of original research.

1. In regard to *the organization of local sections under the International Body,* it was reported that such a sectional society had already been organized as a branch of the International Association of Medical Museums at Frankfort-on-Main, Germany,

under the direction of Prof. B. Fischer of the Senckenberg Institute, as the *Verein zum Austausch Anatomischer Praeparaten.* While the establishment of such a Central Exchange Bureau for Europe was of great advantage, it was felt that a practical necessity also existed for Local Secretaries in countries where languages other than German are spoken, the Senckenberg Institute remaining as the Central European Bureau of Exchange.

The following resolution was passed: That the Secretary, Dr. Abbott, communicate with the English, French, German, Italian, Russian, Scandinavian, Swiss, Japanese, and Australasian members, suggesting the formation of sectional societies or committees under the control of the main International Body, and requesting members of each nationality to send a representative to the meeting to be held in London in conjunction with the XVIIth International Congress of Medicine, there to discuss, formulate, and establish the mechanism of the government of the International Association of Medical Museums and of its sectional societies.

A set of suggestions was framed for the more perfect organization of this Association and of its sectional societies along international lines to be submitted to the consideration of the London meeting.

2. *Preparation for the London Meeting.* The Secretary announced that efforts have been confined so far chiefly to the developing of the Section of Museum Technique of the International Congress of Medicine, the organization of which has been entrusted to the International Association of Medical Museums by the Museum Committee of the Congress. Contributions have been invited under the divisions of Preparation and Preservation of Material, Museum Housing and Display, and Museum Administration, through a circular letter approved by the Museum Committee of the Congress and distributed both through this body and through this Association. A good response had been elicited, and the success of the section seemed already assured. From the exhibits promised the programme for the meeting of the Association itself would chiefly be drawn.

3. *Erection of a Central Bureau for North America for the Preservation of results of original research.* Dr. Loeb announced that the Committee appointed at the previous meeting for the organization of this bureau, had selected McGill University, Montreal, as the most suitable place for the new station, Dr. Maude Abbott having offered her services as Curator, and moved that

the Association express its approval of the preliminary arrangements made. A resolution of confidence was passed, and the Secretary was requested to write to the leading American Investigators in medical research asking them, after a given research is completed, to send their material to McGill, where it will be preserved, catalogued, indexed and will be at all times available for reference.

ERSTE LISTE DER BEI DER MIKROSKOPISCHEN ZENTRALSAMMLUNG IN FRANKFURT A. M. EINGEGANGENEN MIKROSKOPISCHEN PRAEPARATE.

From Prof. Fischer, Director of the Senckenberg Institute and of the *Verein zum Austausch Anatomischer Praparaten,* we have received a short report on the progress of the central microscopical collection at Frankfurt-on-Main, together with a printed list of researches, the original material from which has been presented to the Collection during this first year of its operation. The list, which gives the subjects and references in the literature, includes 64 publications by the following authors: de Amici, Mario u. Da Gradi; Anitschkow, N. N.; Auffermann; Buschke, A.; Fahr; v. Fieandt, H.; Fischer, Bernhard; Forssell, O.; v. Franque, O.; Getzowa, Sophia; Gross, Walter; Hart, C.; Heinsius, F.; Heller, Julius; Hofbauer, J.; Jores, L.; Kirshberg, P.; Kraus, Emil; Lafora, R.; Landau, M.; v. Leeiwen, Th.; Ledmann, Ed.; Lissauer; Loeb, Leo; Lorsch, Fr.; Meyer, Oskar; Miller, John; Morputgo, B.; Murakami, Kota; Naegeli, Th.; Nothdurft, Karl; Pettavel, A.; Plehn, M.; Polland, R.; Prym, Paul; Reiss, W.; Ribbert, H.; Roman, B.; Schmeriber, H. C.; Schum, H.; Simmonds, M.; Simon, W. V.; Stoppato, Ugo; Stimpf, R.; Thomas, Erwin; Tietze, Alex; Unger, W.; Veszpremi, D.; Vogel, M.; Vonwiller, Paul; Wallart, I.; Wallgren, Axel; Wegelin, C.; v. Werdt, F.; Yamagiwa, K.; Zurhelle, E. P.

The microscopic slides in question have been extensively used by the members of the *Verein* for reference, the condition being that the specimens are accessible for study to all and may be borrowed by Ordinary Members of the *Verein* for fourteen days; the borrower being personally responsible for their punctual return in good condition.

CONSTITUTION AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS

AMENDED APRIL 4, 1912

ARTICLE I.—NAME AND OBJECTS.

This Association shall be called The International Association of Medical Museums. It shall have as its objects:

(a) The promotion in a general way of the efficiency of the Medical Museum as a compendium of scientific facts, a store-house of material for, and of the results of, research, and as a medium for teaching.

(b) Discussion of plans of cataloguing and classification, and methods for the preparation and preservation of specimens.

(c) Arrangements for the interchange of specimens and for the specialization of certain museums along particular lines in which they may enjoy the best facilities.

(d) The publication of a Medical Museum Bulletin, which shall aim at the furtherance of the above objects.

(e) The consideration of the feasibility of establishing an Index Pathologicus in the future.

ARTICLE II.—MEMBERSHIP.

The membership shall be elective, and shall be international in scope, including representatives of the leading medical museums throughout the world.

All persons actively engaged in, or interested in, the work of medical museums may become active members on election and the payment of $2 per annum.

Only those persons officially accredited to a medical museum as its representative may vote.

Persons distinguished for eminent services to science, and especially to the cause of museums and of this Association, may be made honorary members.

ARTICLE III.—FEES.

There shall be an admission fee of $2, payable by active members immediately on their election, and an annual fee of $2, payable in advance on January 1st of each year, and falling due the year after election.

ARTICLE IV.—OFFICERS.

The officers shall be a President, three Vice-Presidents, a Secretary-Treasurer, and two Councillors, all of whom shall be elected triennially at the regular meetings of the Association. These officers shall together constitute an Executive Committee.

ARTICLE V.—MEETINGS.

Meetings shall be held annually at the place and time decided upon by the Executive Committee. Every third year the meeting shall be held at a time and place accessible to foreign members, and shall be of an international character, and at this meeting the triennial election of officers shall take place.

ARTICLE VI.—TRANSACTION OF BUSINESS.

All matters of general policy and interest shall be decided by a two-thirds majority vote of all the voting representatives present at a stated meeting. At such meetings nine members shall constitute a quorum.

The vote may be taken in the interim of the meetings by the Secretary by means of correspondence, and the matter submitted shall then be decided by the two-thirds majority vote of those voting.

Together with each stated meeting there shall be a session of the Executive Committee for the transaction of business. At such meetings four members shall constitute a quorum.

ARTICLE VII.—CHANGES IN THE CONSTITUTION.

Amendments to the Constitution shall be decided by the two-thirds majority vote of the active members. Such measures shall be proposed in writing to the Secretary, who shall submit them to the Executive Committee, and through these to the Association, either at the regular meeting or in the interim by means of correspondence.

BY-LAWS.

I.—DUTIES OF OFFICERS.

The President, Vice-Presidents and Secretary-Treasurer shall discharge the duties usually assigned to these offices. The Secretary-Treasurer shall, in addition to these duties, call for and receive the written votes of all the voting representatives in all matters to be decided by correspondence in the interim between the regular meetings, and shall secure papers and addresses for the regular meetings and arrange the program therefor.

II.—The Editorial Committee.

A Committee on Publication, including the President and Secretary, *ex-officio*, and three or more other members, shall be appointed every three years, who shall have as their duty the periodical publication of a Museum Bulletin.

III.—Changes in By-Laws.

A By-Law may be amended by the two-thirds majority vote of the voting representatives, one month after the written notice of the proposed amendment has been received by them.

SAETZUNGEN

DES

VEREINS ZUM AUSTAUSCH ANATOMISCHER PRAEPARATEN

1.

Der Verein *bezweckt*

im Anschluss an die Internationale Vereinigung der Medizinischen Museen und den Internationalen Verband zur Unterstützung wissenschaftlicher Arbeit, und in *Verbindung mit der Deutschen Pathologischen Gesellschaft*, die Förderung aller wissenschaftlichen anatomischen Forschungen. Zu diesem Zweck hat er sich zur *Aufgabe* gesetzt:

a) die Verbreitung und Erhaltung wertvoller anatomischer und histologischer Präparate.

b) den Ausbau der Konservierungs und Präparationsmethoden,

c) die Beschaffung anatomischen Arbeitsmaterials zu wissenschaftlichen Untersuchungen, und endlich,

d) die Förderung der wissenschaftlichen Kritik durch Anlegung einer mikroskopischen Zentralsammlung, um jederzeit die Nachprüfung von Befunden an den Originalpräparaten zu ermöglichen.

2.

Der Verein ist als solcher Mitglied der International Association of Medical Museums, seine Zentralstelle in Frankfurt a. M. ist zugleich europäisches Austauschinstitut dieser Association.

3

Ordentliche Mitglieder des Vereins können nur die Leiter pathologischer und anatomischer Institut und Museen auf ihren Antrag werden. Uber ihre Aufnahme entscheider der Vorstand mit 2/3 Stimmenmehrheit.

4

Ausserordentliches Mitglied kann jeder durch seine Beitrittserklärung werden.

5.

Die *Beiträge* der ordentlichen und der ausserordentlichen Mitglieder betragen 3 M. im Jahre, des Eintrittsgeld ebenfalls 3 M., zahlbar am 1. Mai Jeden Jahres.

6.

Im Anschluss an die ordentlichen Tagungen der Deutschen Pathologischen Gesellschaft finden jährlich *Geschäftssitzungen* des Vereins statt, an denen alle Mitglieder des Vereins teilnehmen konnen, stimmberechtigt sind jedoch nur die ordentlichen Mitglieder.

7.

Die Einberufung der Geschäftssitzung erfolgt durch den Vorstand unter Angabe der Tagesordnung spatestens 4 Wochen vor der Sitzung.

8.

Die Geschäftssitzung wählt aus der Reihe der ordentlichen Mitglieder auf drei Jahre den I. und II. Vorsitzenden. Diese bilden mit den zwei vom Vorstande der Deutschen Pathologischen Gesellschaft zu ernennenden Beisitzern und dem Generalsekretar (s. 9), der zugleich Säckelwart ist, den *Vorstand des Vereins*. Der Vorstand hat in jeder Geschäftssitzung über seine Tätigkeit Bericht zu erstatten und Rechnung abzulegen.

9.

Die gesamte *Verwaltung und Geschäftsfuhrung* übernimmt im Auftrage des Vorstandes das *Senckenbergische Pathologische Institut in Frankfurt a. M.*, dessen Direktor zugleich der ständige Generalsekretar der europäischen Sektion der International Association of Medical Museums ist. Das Senckenbergische Pathologische Institut errichtet zu diesem Zwecke eine *Zentralstelle zum Austausch anatomischer Objekte in Frankfurt a. M.*

10.

Die *Zentralstelle* in Frankfurt a. M., übernimmt:

a) die Vermittelung des Austausches anatomischer Sammlungspraparate,

b) die Besorgung anatomischen Materials zu wissenschaftlichen Untersuchungen, die Erteilung von Auskünften und Nachweisen über derartiges Material,

c) die Versendung mikroskopischer Belegpräparate an die ordentlichen Mitglieder, die der Zentralstelle zu diesem Zweck von Autoren zur Verfügung gestellt werden.

d) die Verleihung von Belegpräparaten aus der mikroskopschen Zentralsammlung (s. § 14).

11.

Die Zentralstelle veranstaltet regelmässig Rundfragen bei allen ordentlichen Mitgliedern mit der Bitte um Angabe:

1) welches Material sie zu Sammlungszwecken im Tauschverkehr anbieten.

2) welches Material sie zu Sammlungszwecken im Tauschverkehr zu erhalten wünschen.

3) ob sie anatomisches Material fur wissenschaftliche Untersuchungen durch die Zentrale beziehen wollen.

Eine Zusammenstellung der Wünsche und Angebot wird regelmässig den Mitgliedern zugestellt.

12.

Einlaufende Wünsche nach Beschaffung anatomischen Materials für wissenschaftliche Untersuchungen werden von der Zentralstelle umgehend an alle ordentlichen Mitglieder weitergegeben.

13.

Der Briefwechsel des gesamten Tauschverkehrs geht über die Zentralstelle, welche jährlich einen Bericht über ihre Tätigkeit dem Vorstande zur Genehmigung vorzulegen und zu veröffentlichen hat.

14.

Im Auftrage des Vereins und der Deutschen Pathologischen Gesellschaft errichtet das Senckenbergische Pathologische Institut in Frankfurt a. M. eine *Mikroskopische Zentralsammlung.* Diese Sammlung bleibt dauernd in Frankfurt und dem Senckenbergischen Pathologischen Institut angegliedert, wogegen das Institut die Kosten fur die Aufbewahrung und Katalogisierung dieser Sammlung trägt.

15.

Die Mikroskopische Zentralsammlung bezweckt die dauernde Aufbewahrung und Erhaltung wertvoller mikroskopischer Präparate. Die Zentralstelle des Vereins wendet sich deshalb, an alle Verfasser histologisch wichtiger Arbeiten mit der Bitte, der Zentralsammlung Belegpräparate ihrer Arbeiten zur Verfügung zu stellen.

16.

Die Mikroskopische Zentralsammlung in Frankfurt a. M. steht allen Mitgliedern zu Studienzwecken zur Verfügung; nur die ordentlichen Mitglieder haben aber das Recht, Präparate aus der Zentralsammlung zu entleihen. Die Leihfrist beträgt 14 Tage, fur pünktliche und unbeschädigte Rücksendung ist der Entleiher haftbar.

17.

Ausser den Beiträgen werden besondere Gebuhren für die Vermittelung der Zentralstelle nicht erhoben. Die Kosten der Präparatengläser und der Versendung von Präparaten tragen die Empfänger bezw. Entleiher.

18.

Aenderungen der Sätzungen nur die Geschäftssitzung des Vereins mit 2/3 Stimmenmehrheit beschliessen, sie bedürfen der Zustimmung des Vorstandes der Deutschen Pathologischen Gesellschaft. Sätzungsänderungen können nur beschlossen werden wenn sie wenigstens 4 Wochen vor der Sitzung durch die Tagesordnung bekannt gegeben worden sind.

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ADMITTED

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1912 Poujol, Prof. Dr., Dept. Path. Anat., University of Algiers, Algeria.

AUSTRALIA.

1907 *Allen, Prof. H. B., Pathological Museum, Univ. Melbourne, Australia.

1907 *Cavenagh-Mainwaring, Dr. W. R., Adelaide University, Adelaide, S. Australia.

AUSTRIA.

1910 Stoerck, Prof. O., IX Allgemeines Krankenhaus, Vienna, Austria.
1907 *Weichselbaum, Prof. Anton, Vienna, Austria.

BELGIUM.

1912 Duyse, Prof., University of Ghent, Belgium.
1912 Pirket, Prof., University of Liege, Belgium.
1911 Sand, Dr. Réné, University of Brussels, Brussels.

BRAZIL.

1910 deCruz, Prof. Oswaldo, Rio de Janeiro, Brazil.
1910 Thomas, Dr. Wolferstan, Instituto Oswaldo de Cruz, Manaos, N. Brazil.

CANADA.

1907 *Abbott, Dr. Maude E., Pathological Museum, McGill University, Montreal.
1910 Birkett, Prof. H. S., 252 Mountain Street, Montreal.
1911 Burnham, Dr. F. W. E., 373 Broadway, Winnipeg, Man.
1910 Byers, Dr. Gordon, McGill University, Montreal.
1910 Chipman, Prof. W. W., McGill University, Montreal.
1910 Francis, Dr. W. W., McGill University, Montreal.
1911 Gruner, Dr. O. C., Royal Victoria Hospital, Montreal.
1910 Gurd, Dr. Fraser B., McGill University, Montreal.
1911 Higgins, Dr. C. H., Dept. Public Health, Ottawa, Ont.
1908 Judah, Mr. E. L., McGill University, Montreal.
1910 Kaufmann, Dr. Joseph, McGill University, Montreal.
1907 *MacKenzie, Prof. J. J., University of Toronto, Toronto, Ont.
1910 Popham, Dr. E. S., Manitoba Medical College, Winnipeg, Man.
1910 Saint-Jacques, Prof. Eugene, Laval University, Montreal.
1907 *Shepherd, Prof. F. J., McGill University, Montreal.
1911 Simpson, Prof. J. C., McGill University, Montreal.
1910 Todd, Prof. J. L., McGill University, Montreal.
1911 White, Dr. E. Hamilton, McGill University, Montreal.
1911 White, Dr. F. J., Moncton, N. B.

CUBA.

1907 *Guiteras, Prof. J., University of Havana, Havana, Cuba.

DENMARK.

1907 *Fibiger, Prof. Johannes, Frederik den 5tes Vej No. 11, Copenhagen, Denmark.
1910 Scheel, Dr. Victor, Communehospital, Copenhagen, Denmark.

ENGLAND.

1911 Andrewes, Dr. F. W., St. Bartholomew's Hospital, London.
1911 Bashford, Dr. E. A., Imperial Cancer Research Hospital, London.
1911 Beattie, Dr. J. M., University of Sheffield, Sheffield, England.
1911 Delepine, Prof. Sheridan, Public Health Laboratory, Manchester, England.
1911 Gibson, Dr. A. G., Faculty of Medicine, Oxford University, Oxford, England
1911 Goadby, Mr. Kenneth, National Dental Hospital, London, England.
1907 *Hall, Prof. J. Walker, University College, Bristol, England.
1911 Hicks, Dr. Braxton, Westminster Hospital, London, England.
1907 *Hunter, Prof. Wm., Charing Cross Hospital Museum, London, Eng.
1908 Izzard, Mr. F. A., Humphrey Museum, Cambridge, England.
1910 Keith, Dr. A., Royal College of Surgeons, London, W. C. England.
1911 Kettle, Dr. E. H., St. Mary's Hospital, London, England.
1907 *Leith, Prof. R. F. C., Pathological Museum, University of Birmingham, Birmingham, England.
1911 Paine, Dr. M., Cancer Research Hospital, London, England.
1911 Smith, Prof. Lorrain, Pathological Museum, University of Manchester, Manchester, England.
1911 Smith, Prof. Eliot, University of Manchester, Manchester, England.
1911 Spilsbury, Dr. Bernard H., St. Mary's Hospital, London, W. Eng.
1910 Stevens, Dr. J. W. W., Liverpool School of Tropical Medicine, Liverpool, England.
1911 Thursfield, Dr. Hugo, St. Bartholomew's Hospital, London, Eng.
1911 Trevor, Dr. R. I., St. George's Hospital, London, England.
1911 Turnbull, Dr. Hubert, London Hospital, London, England.
1907 *Woodhead, Prof. G. Sims, Cambridge University, Cambridge, Eng.
1911 Woodwark, Dr. A. S., St. Bartholomew's Hospital, London, Eng.

EGYPT.

1907 *Ferguson, Prof. Alex., The Director of Government School of Medicine, Cairo, Egypt.

FRANCE.

1911 Alezais, Prof., Institut d'Anat. Pathologique, Marseilles, France.
1911 Curtis, Prof., Institut d'Anat. Pathologique, Marseilles, France.
1910 Courmont, Prof. Paul, Universite de Lyon, France.
1911 Déjérine-Klumpke, Mme. La Salpétriere, Paris, France.
1911 Landouzy, Prof. Doyen de la Faculté de Médécine, 15 Rue de l'Université, Paris, France.
1911 Letulle, Prof., Hopital Boucicault, Paris, France.
1910 Marie, Prof. Pierre, Paris, France.
1911 Ménétrier, M., Médécin des Hopitaux, Paris, France.
1911 Rist, Dr. Edouard, Hopital Laennec, Paris, France.
1910 Roussy, Dr. Gustav, Faculté de Médécine, Paris, France.

GERMANY.

1907 *Aschoff, Prof. J. Ludwig, University of Freiberg i. Br., Germany.
1911 Borst, Prof. Max, Pathologisches Institut der Universität München.
1910 Chiari, Prof. H., University of Strasberg, Strasberg, Germany.
1911 Fischer, Prof. B., Senckenburg Institute, Frankfurt-on-Main, Germany.
1910 Herxheimer, Prof. G., Wiesbaden, Germany.
1910. Kretz, Prof. R., Wurzburg, Germany.
1910 Lubarsch, Prof., Dusseldorf, Germany.
1907 *Pick, Dr. Ludwig, Friedrichs-hain City Hospital, Berlin, Germany.

HOLLAND.

1911 Bolk, Prof., Anatomical Museum, University of Amsterdam, Holland.
1911 de Vries, Dr. Hugo, University Amsterdam, Amsterdam, Holland.
1910 de Jong, Prof. de Josselin, Rotterdam, Holland.
1911 Spronck, Prof. C. H. H., University of Utrecht, Utrecht, Holland.

IRELAND.

1907 *McWeeney, Prof. E. J., Museum of the Mater Misericordiae Hospital, Dublin, Ireland.
1911 Mettam, Prof. A. E., Royal Veterinary College of Ireland, Dublin, Ireland.

ITALY.

1911 Bonome, Prof. A., Instituti Anatomic Pathologico della R. Universita di Padua, Italy.
1911 Guizzeto, Prof. Pietro, Institut di Anat. Patholog. Uni. de Parma.
1910 Martinotti, Prof. G., Anatomical-Patholog'l Dept., University of Bologna, Italy.
1907 *Monti, Prof. Achile, Museum of Pathological Anatomy, University of Pavia, Italy.

JAPAN.

1911 Fujinami, Prof., Imperial University, Kioto, Japan.

NORWAY.

1908 Harbitz, Prof. Francis, University of Christiania, Christiania, Norway.

PHILIPPINE ISLANDS.

1908 Barber, Dr. J. R., Manila, Philippine Islands.
1910 Crowell, Dr. B. C., Bureau of Science, Manila, Philippine Islands.
1910 Strong, Dr. R. P., Bureau of Science, Manila, Philippine Islands.

SCOTLAND.

1908 Miller, Dr. James, New School of Medicine, Bristo St., Edinburgh.
1907 *Muir, Prof. Robert, Pathological Museum of the Western Infirmary, Glasgow, Scotland.
1907 *Ritchie, Prof. J., Laboratory, 2 Forrest Rd., Edinburgh, Scotland.
1907 *Sutherland, Prof. L. R., University of St. Andrew's, Dundee.
1911 Teacher, Dr. John H., Hunterian Museum, Glasgow, Scotland.
1911 Wade, Mr., Museum Royal College of Surgeons, Edinburgh.

SWITZERLAND.

1907 *Askanazy, Prof. M., University of Geneva.

SWEDEN.

1910 Forssmann, Prof., Lund, Sweden.
1910 Quesnel, Prof., University of Upsala, Upsala, Sweden.
1910 Sundberg, Prof. Carl, Path. Dept. Karolinski Institut, Stockholm.

UNITED STATES OF AMERICA.

1907 *Albert, Prof. Henry, University of Iowa, Iowa City, Iowa.
1911 Bartlett, Dr. C. J., Yale University, New Haven, Conn.
1912 Bell, Dr. E. T., University of Minnesota, Minneapolis, Minn.
1908. Cone, Prof. Claribel, Women's Medical College of Baltimore, Baltimore, Md.
1907 *Coplin, Prof. W. M., Jefferson Medical College, Philadelphia, Pa.
1910 Craig, Dr., Army Medical Museum, Washington, D. C.
1908 Duval, Prof. C. W., Tulane University, New Orleans, La.
1910 Francis, Edward, Public Health and Marine Hospital Service, Washington, D. C.
1907 *Gaylord, Dr. Harvey, Institute for Study of Malignant Diseases, 113 High Street, Buffalo, N. Y.
1911 Harris, Dr. D. L., Hospital Department, St. Louis, Mo.
1910 Hewitt, Dr. J. H., Baylor University Med. Sch., Dallas, Texas.
1908 Hirsh, Dr. J. L., University of Maryland, Baltimore, Md.
1907 *Howard, Prof. Wm. T., Western Reserve University, Cleveland, O.
1908 Klotz, Prof. Oskar, University of Pittsburg, Pittsburg, Pa.
1907 *Lamb, Dr. D. S., Army Medical Museum, Washington, D. C.
1910 Lambert, Dr. R. A., College of Physicians and Surgeons, New York.
1907 *LeCount, Prof. E. R., Chicago University, Chicago, Ill.
1910 Lee, Prof. Thos. G., Institute of Anatomy, University of Minnesota, Minneapolis, Minn.
1908 Libman, Dr. Emanuel, Mount Sinai Hospital, New York.
1910 Loeb, Prof. Leo Barnard, Free Skin and Cancer Hospital, St. Louis, Mo.
1910 Maddox, Dr. R. D., Cincinnati, Ohio.

1907 *MacCallum, Prof. W. G., Dept. Pathology, College of Physicians & Surgeons, New York.
1907 *MacFarland, Prof. Jos., Medico-Chirurgical College of Philadelphia, Philadelphia, Pa.
1910 Mandlebaum, Dr. F. S., Mount Sinai Hospital, New York.
1908 McConnell, Prof. Guthrie, Temple University Medical School, Philadelphia, Pa.
1911 Milne, Dr. Lindsay S., Rialto Building, Kansas City, Mo.
1908 Mohler, Dr. J. R., Bureau of Animal Industry, Washington, D. C.
1907 *Ophuls, Prof. Med. Dept., Leland Stanford Jr. University, San Francisco, Cal.
1911 Opie, Dr. Eugene L., Washington University, St. Louis, Mo.
1910 Ordway, Dr. Thos., Harvard Medical School, Boston, Mass.
1907 *Pearce, Prof. R. M., Dept. Research Medicine, University of Pennsylvania, Philadelphia, Pa.
1910 Rhea, Dr. L., Harvard Medical School, Boston, Mass.
1911 Robinson, Dr. H. E., Instit. Public Health & Bacteriology, University of Minnesota, Minneapolis, Minn.
1911 Robinson, Dr. J. L., Waco, Texas.
1912 Rusk, Dr. G. Y., Curator, Museum of Hearst Lab. Path. Univ., Hearst, Cal.
1908 Russell, Major F. F., Army Medical Museum, Washington, D. C.
1907 *Smith, Prof. A. J., University of Pennsylvania, Philadelphai, Pa.
1908 Snow, Dr. W. F., Leland Stanford University, Santa Clara County, Cal.
1907 *Souchon, Prof. Edmund, Tulane University, New Orleans, La.
1908 Stokes, Dr. W. R., College of Physicians & Surgeons, Baltimore, Md.
1911 Symmers, Dr. Douglas, Carnegie Laboratory, 338 E. 26th St., New York.
1910 Warren, Prof. Collins, Harvard Medical School, Boston, Mass.
1907 *Warthin, Prof. A. S., University of Michigan, Ann Arbor, Mich.
1908 Watters, Prof. H., Boston University School of Medicine, Boston, Mass.
1910 Whipple, Dr. G. H., Johns Hopkins Hospital, Baltimore, Md.
1907 *Whitney, Prof. Wm. F., Warren Anatomical Museum, Boston, Mass.
1912 Williams, Dr. H. U., Univ. of Buffalo, N. Y.
1910 Wilson, Dr. L. B., Rochester, Minn.
1910 Wolbach, Prof. S. B., Harvard Medical School, Boston, Mass.
1907 *Wollcott, Prof., University of Nebraska, Omaha Medical College, Lincoln, Nebraska.
1910 Wollstein, Dr. Martha, Babies' Hospital, New York.
1908 Woolley, Prof. Paul G., University of Cincinnati, Cincinnati, Ohio.

DECEASED.

1907 *Major James Carroll, M.D. Curator, Army Medical Museum, Washington, D. C., Chairman of the Organizing Committee and first President of this Association. Born, June, 1854; Died, August, 1907.

1911 Leonard Worcester Williams, A.M., Ph.D. Instructor in Comparative Anatomy, Harvard Medical School. Born, July, 1875; Died, September, 1912.

1908 Sir Jonathan Hutchinson, Post-Graduate School, London, England. Died, June 26, 1913.

THE
INTERNATIONAL ASSOCIATION
OF
MEDICAL MUSEUMS

BULLETIN NO. V

EDITED BY

ALDRED SCOTT WARTHIN, M. D.
MAUDE E. ABBOTT, M. D.

Issued at Ann Arbor, Michigan, U. S. A.
and Montreal, Canada
June 1, 1915

TABLE OF CONTENTS

PAGE

EDITORIALS:

1. The Pan-European War in relation to the International Association of Medical Museums..... 7
2. The Museums of the XVIIth International Congress of Medicine, and the London Meeting of this Association 8
3. Lord Strathcona's Gift to the Capital Fund...... 11

OBITUARY:

1. The late Lord Strathcona and Mount Royal..... 12
2. The late Sir Jonathan Hutchinson............ 14
3. Charles Sedgwick Minot..................... 16

ADDRESSES:

1. Presidential Address at the London Meeting of the International Association of Medical Museums 18
Prof. A. S. Warthin.
2. Address of President Elect.................... 25
Prof. J. Ludwig Aschoff.

ORIGINAL COMMUNICATIONS:

General Articles:

1. Public Service in the University as a means of aiding Medical Research.................... 28
J. G. Fitzgerald.
2. The Public Health Museum, its Possibilities and Uses 30
H. E. Robertson
3. The Experimental Method as Utilized in the Clinico-Pathological Conference 34
K. T. Karsner.
4. The Simultaneous Study of Gross and Microscopic Appearances in the Study of Pathology.. 38
Henry Albert.
5. Ueber das Durchsichtigmachen von Praeparaten. 41
W. Spalteholz.

6. A Few Effective Methods of Preparing and Mounting Specimens for exhibition purposes... 45
Chas. F. Silvester.
7. The Use of Large Sections Mounted as Lantern Slides, as an aid in Museum Teaching......... 46
Carl V. Weller.
8. Eine neue Methode zur Konservierung des Herzens 48
D. Wolhard.
9. On the Application of Wolhard's Method for the Preservation of the Heart.................. 49
10. India-Ink Injection of Bursal Spaces of Heart, Showing Distribution of Auriculo-Ventricular Bundle 50
J. Kaufmann.
11. The Staining of Pathological Specimens in the Gross 51
Oskar Klotz.
12. A New Method of Preparing Museum Specimens to show Differentiation of Tissues............ 53
R. H. Malone and L. Heddick.
13. Rapid Colour Method for Differentiation of Fat in Gross Specimens 55
J. Kaufmann and E. L. Judah.
14. On the Demonstration of Micro-Chemical Reactions in Museum Specimens................ 56
A. S. Warthin.
15. A Modified Jores' Method for the Preservation of Colours in Gross Specimens.................. 59
Oskar Klotz and W. W. G. Maclachlan.
16. The Advantages of Jores' Fluid, as Modified by Klotz 61
J. H. Hewitt.
17. On the Preservation of War Material for Museum Purposes 63
J. G. Adami and E. L. Judah.
18. An Efficient and Inexpensive Permanent Mounting Fluid for Gross Specimens.............. 66
S. R. Haythorne.
19. Colour Preservation in Gross Specimens, by Formalin Chloral-Hydrate Method.............. 68
S. J. S. Peirce.

20. "Arsenious Jelly," Method of Preserving Colours of Pathological Specimens (Abstract)........ 69
Sheridan Delépine.

21. Experience in the Use of Gelatin in Mounting Anatomical Preparations 73
R. J. Terry.

22. Delépine's Arsenic Glycerine Jelly Method of Preserving Gross Specimens.................... 76
C. E. Royce.

23. The Use of Plaster of Paris in Mounting Gelatin Preparations 80
C. E. Royce.

24. On the Use of Agar-Agar for Mounting Specimens between Glass Plates.................. 82
J. H. Hewitt.

25. Cement for Sealing Retangular Museum Jars.... 86
Wm. Coburn.

26. The Sealing of Museum Jars.................. 87
Wm. Muir and E. L. Judah.

27. Series of Sizes for Square Museum Jars in use at the Medical Museum at McGill University..... 89
E. L. Judah.

28. Rapid Method of Cleaning Bone............... 90
E. L. Judah.

29. A Method for Permanent Exhibition of Tissues Mounted in Agar-Agar between Glass Plates and Microscopic Appearances of the Same..... 91

MICROSCOPIC TECHNIQUE:

30. On a Method of Maceration, Preparatory to Teasing 96
Carl Huber.

31. Staining of Tissues Growing in Vitro.......... 98
R. A. Lambert

32. Vital Staining 100
Lydia DeWitt.

33. On Staining Fresh Tissues for Diagnostic Purposes 105
Louis B. Wilson.

34. On the Technique of Producing Frozen Sections for Rapid Diagnosis...................... 106
S. J. S. Peirce.

35. A New Rapid Method for Staining Myelin Sheaths and Axis Cylinders Simultaneously (Weigert modified), Suitable for Celloidin and Frozen Sections 108
Georgine Luden von Heumen.
36. A New Selective Method for Staining Nerve Fibres and Axis Cylinders.................. 113
Réné Sand.
37. Abstract of Demonstration on the Staining of Cells and Axis Cylinders in Brain Material Fixed in Bichromic Salts, and on Liesogang's Method of Mounting Microscopic Sections in Gelatin 114
C. U. Ariens Kappers.
38. A Method of Making Permanent Mounts of Cultures of Bacteria.......................... 119
J. H. Hewitt.
39. Single Bacterial Colonies in Sealed Petri Dishes as Museum Preparations................... 121
A. A. Bruére.

MUSEUM RESEARCH; CARDIAC ANOMALIES:

40. Demonstration of Two Rare Cardiac Malformations 122
Carl V. Weller.
41. Congenital Pulmonary Atresia with Perforate Interventricular Septum in a Patient Aged 9 years and 6 weeks............................ 125
S. B. Wolbach and Maude E. Abbott.
42. Two Cases of Widely Patent Foramen Ovale.... 129
Maude E. Abbott.
43. On the Differentiation of Two Forms of Congenital Dextrocardia 134
M. E. Abbott and J. C. Meakins.

EXPERIENCE DEPARTMENT:

Introductory Note 139
Replies to Experience Circular No. 1, from H. B. Allen and W. G. MacCallum................ 139
Replies to Experience Circular No. 2, from Georgine Luden V. Heumen, H. U. Williams, L. B. Wilson, R. A. Lambert, F. A. Izzard, E. L. Judah, Wm. Coburn, Wm. Muir............. 142

DEPARTMENT OF EXCHANGES:

Requests from J. Forssman, C. R. Silvester, R. P. Strong, A. J. Smith, and J. L. Todd.......... 148

REPORTS:

Interim Report from International Secretary, April, 1912-August, 1913.................... 152
London Meeting of International Association, August 6th-9th, 1913........................ 156
Interim Report from International Secretary, August, 1913, to date....................... 165
Toronto Meeting of American Section, April 9th, 1914 170
St. Louis Meeting of American Section, April 1st, 1915................................... 176

CONSTITUTION AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS 185

LIST OF OFFICERS AND MEMBERS TO MAY 1st, 1915 188

The International Association of Medical Museums

BULLETIN NO. V.

Ann Arbor, Michigan, and Montreal, Canada

June 1, 1915

EDITORIALS

THE PAN-EUROPEAN WAR AND THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

This Bulletin contains the proceedings of the last International Meeting of this Association, which was held in London in August, 1913, in conjunction with the XVIIth International Congress of Medicine, as well as those of two meetings of the American Section held in this country since. To recall these proceedings is to remember London as it was during the concourse of nations of that great Congress, and to bring sharply before the mind the changed conditions today, when the very men who met each other so cordially in the friendly interchange of scientific thought, are now engaged in an encounter of deadly hostility. So serious has the situation become, and so terrible the loss of life, that all other matters sink into insignificance, in comparison with the overpowering need for the amelioration of the suffering belligerents. Nevertheless, the duty remains for such an Association as this, to preserve its integrity, and to cherish the memory of the international amity in which it originated, in the hope that in a happier day, when a just peace may at last be proclaimed, it may act as one of the links that must bridge across the chasm that divides those who are now bitter foes. It is with this thought and in this hope that we introduce this Bulletin to our membership—to whom it has long been pledged.

THE SECTION OF MUSEUM TECHNIQUE AND THE MUSEUMS OF THE XVIITH INTERNATIONAL CONGRESS OF MEDICINE.

The action of the Museum Committee of the Congress in originating a special Section of the Congress Museum devoted to the subject of Museum Technique, and the invitation tendered by them to the International Association of Medical Museums to take part in the organization of this Section, was a definite and generous acknowledgement on the part of the Congress of the activities of this Association in the interest of Museum methods since its inception in 1907. The real success of this Section is on this account the more gratifying to record. Circular letters inviting contributions to this Section of the Congress Museums were immediately issued by the Museums Association, and the international character of our membership made this practically a universal challenge to which a wide and liberal response ensued. The best impression of the remarkable success of the Section is to be obtained from the following resolution proposed at the closing meeting of the Museums Association by Mr. H. W. Armit, Secretary, and seconded by Dr. Arthur Keith, President of the Museum Committee of the Congress, and unanimously carried:—

"Since a prolonged experience in the organization of Congress Museums has forced upon me the conclusion that efficiency was sacrificed, much time lost and valuable experience wasted, by the placing of arrangements at each Congress in the hands of new and untrained persons; and in view of the fact that in the International Association of Medical Museums we have a Society of museum experts, peculiarly fitted to undertake the organization of the Congress Museum as a whole.

Resolved: *That in future the organization of the Museums of the International Congress of Medicine be entrusted to the International Association of Medical Museums.*" Needless to say, such a resolution as this is at once the seal of work well done and the guerdon of a fruitful field for future usefulness.

The Congress Museum occupied a long series of well-lighted rooms on the second floor of the Imperial College of Science, South Kensington. It was divided into twenty-three sections, of which twenty-two, Anatomy, Physiology, Pathology, etc., corresponded with the divisions of the Congress proper, while the twenty-third was an additional special department, the section of Museum Technique, which was organized, by special invitation, by the Medical Museum Association, with the co-operation of the Museum Committee of the Congress. This section occupied a relatively large space at the extreme end of the collection, forming in itself a miniature Museum, the large International membership of the Association contributing to it scientific material of the most varied character, all of which being especially prepared for exhibition purposes was legitimately comprised under the heading of Museum Technique. Following the circulars sent out by the Association, the section was divided into: (1) Museum Technique proper consisting of methods of preservation, preparation and mounting of material; (2) Methods of Housing and Display, and (3) Museum administration, including entry system, methods of indexing, cataloguing, teaching, etc.

Among exhibits of especial interest in this section were the following: *Prof. Wahby* of Cairo, Egypt, showed a remarkably large and elaborate collection of specimens prepared by corrosion injection methods, both in fusible alloy, colored celluloid and wax, showing the cavities or channels of the body, and the relation of their ultimate ramifications. This old-time method was here carried out on such an extensive and complicated scale both in the human subject and in the lower orders, as to present some finer anatomical and physiological points not previously objectively demonstrated. *Prof. Spalteholz* of Leipzig had a beautiful exhibit, which he demonstrated in person throughout the Congress, of specimens showing his special method of rendering organs and tissues transparent by placing them in a solution of similar refractive index. Thus a human hand, the arteries injected with cinnabar-gelatin, decalcified and rendered maximally transparent by means of a mixture of oil of wintergreen and benzyl benzoate; the skeleton of a sole stained with alizarin, a transparent human skull, etc. The various stages in the process were also shown, i. e., (1) Bleaching in 40% alcohol, (2) benzol, (3) mixture of oil of wintergreen and benzyl benzoate equal parts. *Prof. Wolhard* of Mannheim, had a unique and most valuable series of hearts fixed by a special method to show different degrees and stages of hypertrophy and dilatation of the chambers in the various valvular lesions and in extra-cardiac strain. His procedure was to distend the heart chambers at autopsy, preserve in Kaiserling, and after fixation pass through graded strengths of alcohol, xylol and xylol-paraffin, finally immersing in liquid paraffin and keeping at a suitable temperature until thoroughly saturated. Then remove from the paraffin bath and drain. Windows may be cut from the wall of the chambers, the organ retaining its shape as during life. *Prof. Adolph Meyer* of Baltimore showed glass reconstruction models of the brain, in which the magnified serial sections were traced on glass sheets in inks, variously colored to represent the different anatomical structures, the whole bound together and forming a transparent glass block, in which the intimate relations of parts is visible. Loose-leaf catalogues on slightly different plans were shown by *Prof. Lorain Smith,* Edinburgh, *Dr. Braxton Hicks* and the McGill Medical Museum. *Mr. E. L. Judah* of McGill had a number of exhibits, which elicited much interest and approval, among which may be especially mentioned series of museum jars, graded to fit various organs, and a special museum jar cement.

Numerous exhibits of great interest were seen in other parts of the Congress Museum, as well as in the section of Museum Technique. Thus, splendid series illustrating occupational diseases with the causation of fatalities and results were portrayed. The new Cardiac Pathology was abundantly illustrated by electro-cardiographic and polygraphic work.

The Wellcome Historical Museum as originated by Dr. H. S. Wellcome, of the well known Burroughs & Wellcome firm was one of the most important and interesting features of the whole Congress. It was recognized as the Museum of the Section of the History of Medicine, and was opened by Sir Thomas Barlow, President of the Congress, with addresses by Sir Rickman Godlee, President of the Royal College of Surgeons; Sir Francis Champneys, President of the Royal Society of Medicine; Sir Frederick Treves, and Dr. Norman Moore, President of the Section of History of Medicine. The collections occupied two large suites of rooms and were arranged on the basis of the evolution of the History of Medicine along the lines of primitive Folk-lore on the one hand and the development of the Natural Hippocratic School on the other.

This is, we believe, the first purely Historical Museum inaugurated. Its successful inception was greeted with enthusiasm and appreciation by the International Congress of Medicine.

It is of interest to know that this highly important collection remains in London as a permanent Institute and that it is another of the great English Museums that owes its formation to the initiation and generosity of a private individual, Mr. H. S. Wellcome, who has recently honored this Association by enrolling himself on its list of members.

LORD STRATHCONA'S GIFT OF A CAPITAL FUND.

The remarkable success of the London meeting and of the Section of Museum Technique of the Congress Museum had a direct and practical outcome of much importance to the future of this Association. The relatively small income derived from the low membership fee (sometimes, unfortunately, in arrears), and the combined cost of the heavy international postage and the publication of a suitable Bulletin made the maintenance of the Association at the requisite standard of efficiency a difficult problem, which was becoming the subject of the gravest anxiety to its officers, especially at a time when it was felt that the importance of the work already done, and the larger field of usefulness presenting itself, made an increase rather than a diminution of activities the natural sequence of the enthusiasm aroused.

These facts were laid before the late Lord Strathcona and Mount Royal, whose interest in educational matters, especially those pertaining to the profession of medicine, was well known, and whose broad international sympathies had just been manifested to the members of the Congress in various practical ways, with the suggestion that a relatively small endowment fund might at the present juncture secure the Association in its future career of usefulness. This representation, which was made by the Secretary, Dr. Maude Abbott, was warmly supported by Prof. F. J. Shepherd, Dean of the Medical Faculty of McGill University, Sir Thos. Barlow, President of the Congress, and Sir Wm. Osler, Bart., and was met by Lord Strathcona with the utmost sympathy and with generous promptitude by the promise of the immediate gift of one thousand pounds. Later, on October 23rd, 1914, his personal cheque for the slightly larger sum of $5,000.00 was received, and was paid over to the trustees of McGill University who hold it in trust and subject to the order of the International Association of Medical Museums. The interest amounting to some $250.00 a year is paid in to the bank account of the Association, and is sufficient, with the membership fees received, for the defrayment of the current international expenses.

By this act of timely generosity, this Association takes its place among the few endowed Societies in existence, and is removed from a precarious position to one of assured usefulness. Not the least part of the practical assistance which this Association derives from the financial support it received, is the motive power that comes from the recognition of its usefulness, and from the obligation that rests upon us to fulfill, by a future of wide influence, the faith of one who gave at a time while it was, still with us, the day of small things.

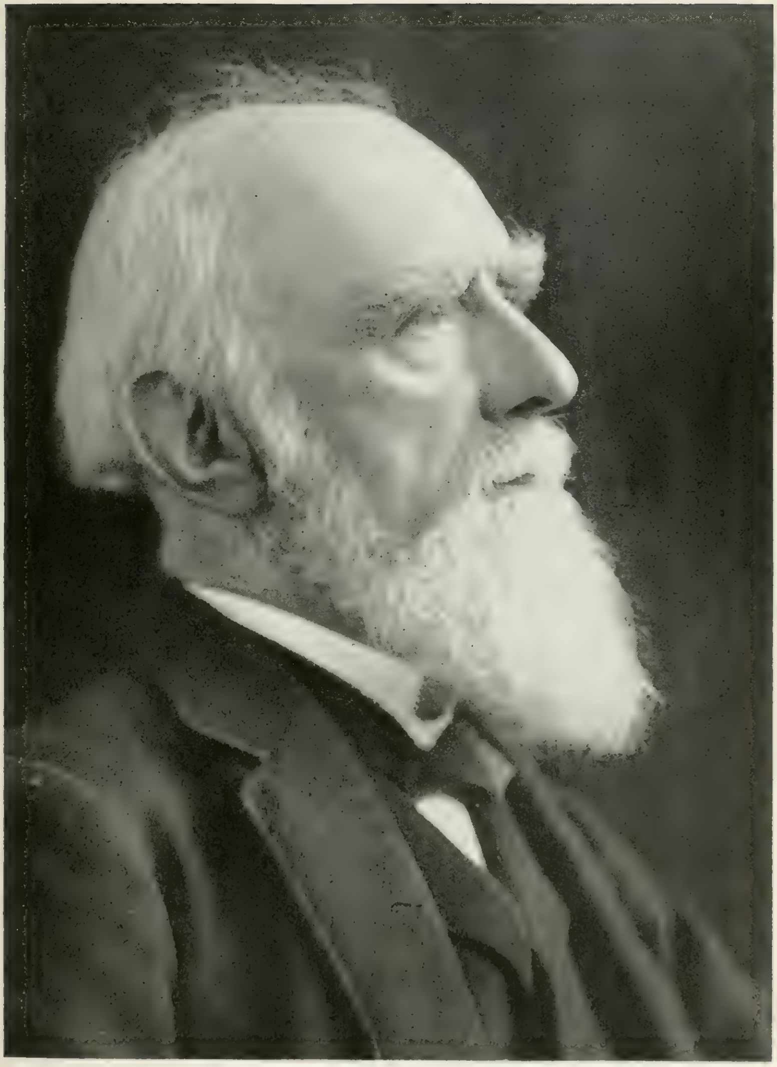
OBITUARIES

Lord Strathcona and Mount Royal

August 6, 1820—January 19, 1914.

The name of Lord Strathcona, Canadian Financier and Philanthropist, so well known throughout the British Empire, will be familiar to all members of this Association who were in London in August of 1913, and all will remember him as the grand old man of patriarchal age, who stood erect for three hours to receive in his own person, the whole International Congress of Medicine, three thousand strong, who congregated at his great reception to *all* members at the Botanical Gardens. This entertainment was remarkable as the only one of the Congress to which all members were invited, without restriction of number or space, and the fact typifies the broad-minded and wide-hearted spirit of his philanthropic and public work. As Lord High Commissioner for Canada in London, and Chancellor for McGill University, he was especially well known to Canadians, but many acts like the above gave him recognition far beyond the bounds of the British Empire.

The story of Lord Strathcona's life is essentially that of a pioneer who arrives through days of stern living and hard reality at an undreamed-of breadth of achievement that springs in part from his own efforts, and in part from the developing resources of the country in which his early labors have been spent. Of Scottish birth and extraction, he sailed for Canada to enter the service of the Hudson Bay Company, in 1838, when only a boy of 15, and spent many years, first in solitary exile in charge of a post on the bleak coast of Labrador, and later, in the Canadian North West as Chief Factor and Resident Governor of the Hudson Bay Company. Through this long apprenticeship, passed in a land of widening interests, growing railroads, and developing mineral resources, he gradually acquired the statesmanship, influence, and great financial power, which enabled him to carry out the philanthropic benefactions of his later life on a very wise and liberal scale. One of the chief promoters of the Great Canadian Pacific Railway in 1886, he was associated with most of the advancements in Canadian history from 1871 until his retirement from politics in 1896, and from that time he assumed charge of



Lord Strathcona and Mount Royal
August 6, 1820—January 19, 1914

Canadian interests in London as Lord High Commissioner for Canada. He gave freely of his great wealth to many deserving causes, but educational interests had the first claim, McGill University alone, receiving two million dollars at his hand.

One of his last acts of public benevolence, occurring only three months before his death, was his gift to this Association of a capital fund of five thousand dollars. He gave, with characteristic insight, at a time of serious need. For this his name will always be held by members of this Association in lasting and affectionate remembrance.

SIR JONATHAN HUTCHINSON, F.R.C.S., F.R.S.,
July 23rd, 1828—June 23rd, 1913.*

In the death of Sir Jonathan Hutchinson, which took place on June 23rd, 1913, we have to recognize the passing of one, probably the most versatile genius of his age, who was distinguished, not only as an eminent surgeon, an active practitioner, a leading skin specialist and the greatest authority on syphilis, a noted medical journalist and a prolific contributor to the scientific and literary periodicals of his time, but also, that which concerns us here chiefly, the greatest exponent of the Museum idea which the medical world has ever known. What he did in the organization and development of the objective side of medical and indeed of all educational methods stands apart, as a thing unrivalled, even in that England which was the home of Hunter and Paget, and which has been the cradle of the greatest teaching collections in the world. His Clinical Museum on Park Street, and its later development in the London Policlinic on the one hand, and his popular collections at Selby and Haslemere on the other, presented graphic correlations of innumerable facts, arranged with logical precision, to a degree and on a scale not attempted by any other worker. He had a real interest in the proceedings of this Association and presided at the meeting held at the Royal College of Surgeons, to further its interests, in 1911,[1] and it was by his advice that the appeal for financial support was made, to which Lord Strathcona made such a generous response.

Sir Jonathan Hutchinson was born at Selby in Yorkshire of Quaker parents, and retained the faith of his fathers throughout his life. Behind and beneath all his great accomplishments burned the steady light of the simple minded Quaker faith, which never left him, and which in the words of a biographer "coloured his whole life, bearing the rich fruits of sympathy, kindness, and gentleness, and above all the love of Truth and the steady unswerving devotion of a long life to its quest." He was apprenticed at 16 to a physician in his native town, and there and at St. Bartholomews in London studied his profession, qualifying as a member of the Royal College of Surgeons in 1850. In this Institution, he was, from the first, a marked man, becoming Fellow, prizeman, professor, member of council, examiner, Presi-

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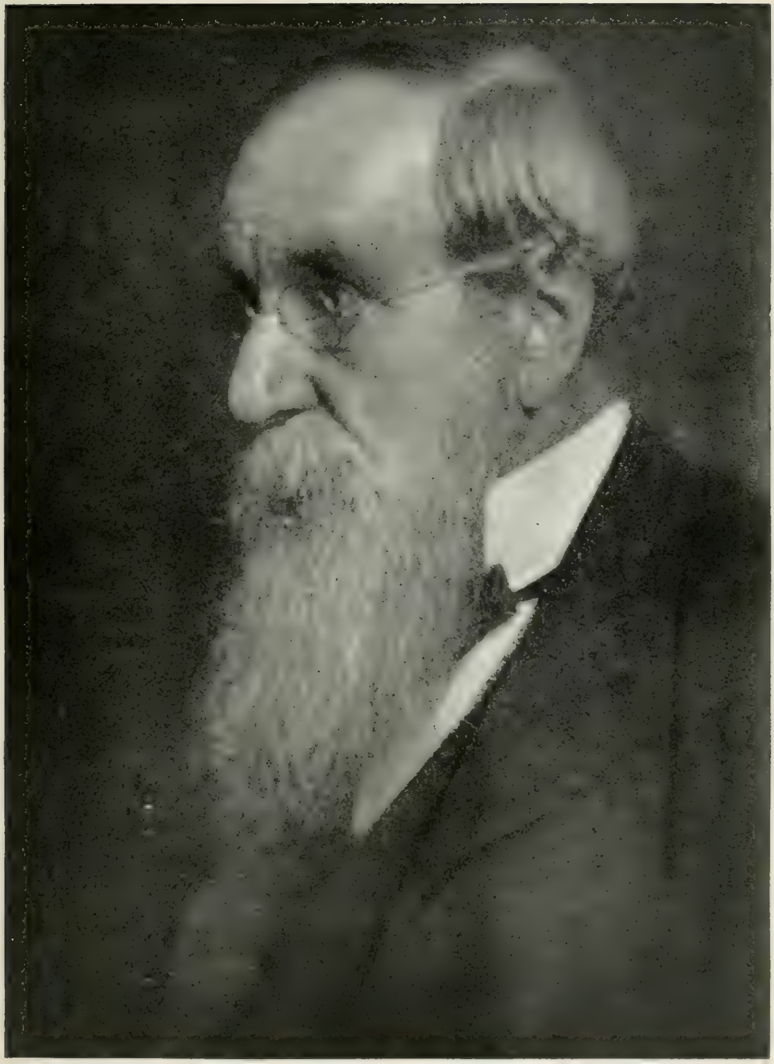
* See British Medical Journal, June 28th, 1913, page 1398. The Friend, July, 1913, page 440.

[1] See Bulletin No. IV, page 64.



Sir Jonathan Hutchinson, F.R.C.S., F.R.S.
July 23, 1828—June 23, 1913

dent and finally trustee of the famous Hunterian Collection. No better clue to his many-sidedness could be given than his connection with the various Medical Societies, for he was President at various times, of the Royal Medical and Chirurgical, Pathological, Hunterian, Ophthalmological, and Neurological Societies. Although a specialist along so many lines, he prided himself chiefly upon the fact that he was, first of all, a great practitioner, declaiming vigorously against all forms of narrow specialism. His strenuous life in London necessitated a place of rest and retreat, and this he found in his later years in the beautiful district of Hindhead in Surrey, near the village of Haslemere. Here, in a home so full of books, that it was well-described by its name of "The Library," he spent long Sundays, not altogether of rest, but of vigorous work among the people of the country-side to whom, with the unswerving energy and devotion of the great teacher, he expounded the facts of natural science in long rambles through the woods, or in hours spent amid his own unique collections.

These collections, housed at the last, in a large series of one story wooden buildings, erected on his own estate, constituted the well known popular Haslemere Museum, an institution quite unique in its character and its scope. Here not only objects of medical interest were preserved, but also, and to a far greater extent, objects of historical, literary, geological, etymological, botanical, or other scientific interest, and especially such as bore on the archaeology, and the natural history of the locality were assembled, arranged either in chronological order or, where this did not apply, in some other form of definite sequence.

Reward to him came surely and steadily. In 1882 he was elected a Fellow of the Royal Society; he received Honorary degrees from the Universities of Oxford, Cambridge, Edinburgh, Dublin, Glasgow, and Leeds; and in 1908 he accepted a knighthood, which on former occasions he had declined. "He had, however, a richer reward than all these, for by his persistent labour and by the faithful exercise of his gifts he made himself of that rare species of master-worker whose reward is that he has served the whole human family. The few men of whom that may be said are the bearers, not only of world-wide fame, but they have moved the world sunward and led mankind onward into the new fields of truth."

The inscription upon his funeral notice strikes the keynote of his life.

"I thirst for Truth
But shall not drink it till I reach the Source."

CHARLES SEDGWICK MINOT, D.S., LL.D., D.Sc.

December 23, 1852—November 19, 1914.

Only a few months before his death Prof. Minot honored this Association by accepting election to its membership. It remains our lasting privilege and benefit that we retain, upon our roll, the name of one who was among the most distinguished medical scientists this continent has produced, and whose series of embryos in the Anatomical Department of the Harvard Medical School, rank among the finest special Museum Collections in the world.

The words of his biographer, Dr. Frederic Lewis,* from whose narrative the following facts are taken, well express the high import of his life and work:

"The rarity in this nation of such achievement as that of Charles Sedgwick Minot brings home to us the profound importance of his work, which has now been completed. Even while oppressed by recent bereavement, we can trace with just pride the career of this eminent American anatomist. * * * Retaining the broad outlook of the earlier naturalists, he devoted himself intensively to a narrow field of scientific enquiry, and has made an impressive contribution to his chosen science of anatomy. "Great professors make a great school," as Prof. Minot once said, and he has given to the Harvard Medical School an international renown."

Professor Minot was a native of Boston and passed his childhood and youth, on an estate of some thirty acres, containing swamp and forest ground, where he early found scope for his bent as a naturalist. He received the Bachelor of Science degree, at the Massachusetts Institute of Technology, and later, in 1878, after some two years spent in physiological research the degree of Doctor of Science from Harvard University. He then returned to the study of morphology, which remained his chosen field, under the guidance of Ranvier in Paris and Ludwig and Leuckhart, in Leipzig and Würzburg, with whom he mastered the latest methods of microscopic technique and caught the spirit of original investigation. He was appointed lecturer in Embryology in the Harvard Medical School in 1880, and set out at once upon the difficult task of raising the standard of medical education, then at a low ebb, in the United States, while developing his own course of laboratory instruction along lines which might best

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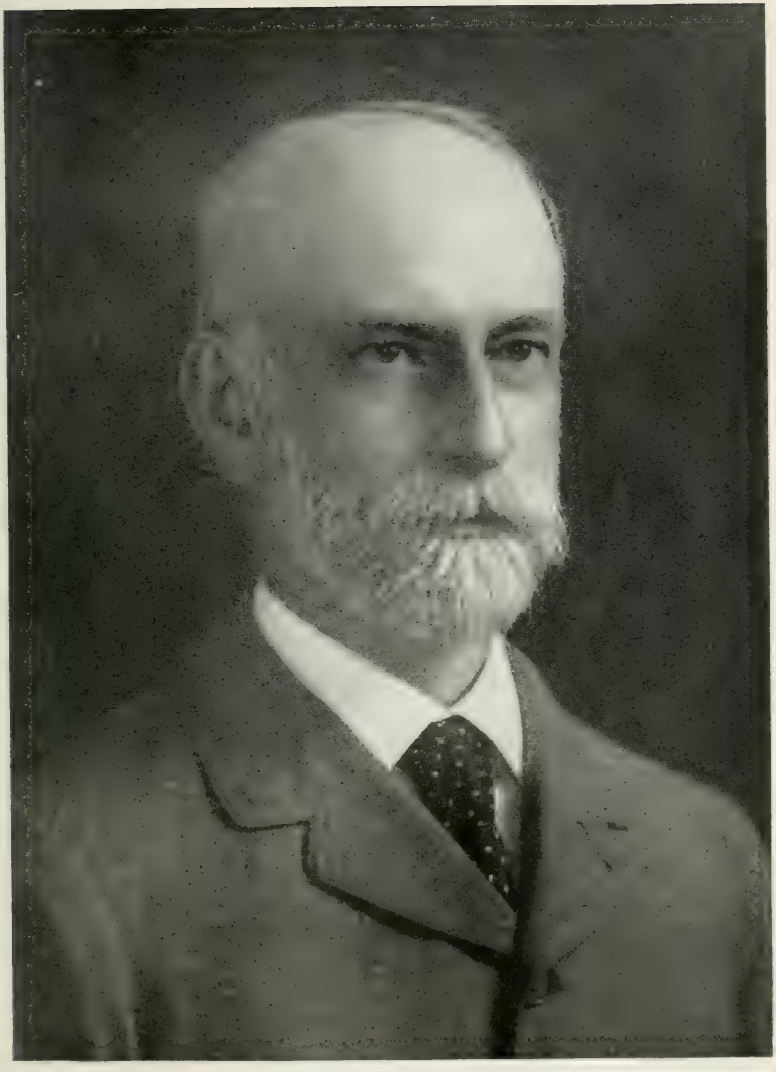
* Boston Med. and Surg. Journ. CLXXI, 24, p. 911-914. Dec. 10, 1914.



Charles Sedgwick Minot, S.D., LL.D., D.Sc.
December 23, 1852—November 19, 1914

secure the accurate knowledge of facts, and stimulate research. Beginning with an equipment of eighteen microscopes, and a yearly appropriation of fifty dollars for the Department of Histology, he, by his own incessant labors, seconded in later years by a devoted and enthusiastic staff of assistants, evolved a laboratory system that in the opportunities it affords to research workers is perhaps unequaled anywhere, supplied with trained service, expert technicians, and having on its shelves a collection of nineteen hundred human embryos, cut and mounted in serial sections, each of which is carefully catalogued and accessible for use. In his own words this collection presents "a sort of cyclopedia of vertebrate embryology to which one can turn at any time and get the desired information as to the principal features of development of any structure whatsoever."

To this series he added later, a collection of one hundred and fifty embryos in complete serial sections for students' study.

Professor Minot's contributions to literature are many and varied, comprising over one hundred and eighty scientific notes and papers. He is perhaps best known through his *Text-book of Human Embryology, and his Laboratory Text-book of Embryology*, the latter based on the morphology of the pig embryo, a third edition of which he left practically ready for publication in 1914. He was deeply interested in the promotion of scientific research in all ways and held membership or Presidency in many scientific Societies in Belgium, England, France, Germany and Italy as well as America. Honorary degrees were conferred upon him by the Universities of Yale, Oxford, Toronto and St. Andrews in Scotland, and he went as Exchange Professor to Berlin in 1913 as the Official Representative of Anatomy in America. His services to Science in the elaboration of the microtome are well known.

He preserved to the end the many-sided tastes of a sincere lover of nature whose early training had sprung, first of all, from the personal knowledge and love of the growing things of his own countryside. One of the great interests of his later life was the pursuit of horticulture, and he cultivated rare varieties of peonies in the gardens of his home at Milton, near Boston. "By clear merit he made his way," and through admirable traits of character he won the friendship of biologists in every field. For, as President Eliot says of him, "Minot was a scientific optimist: full of hope for perpetual progress and for useful results at many stages of the long way . . . Such is the faith which inspires the devoted lives of scientific inquirers."

ADDRESSES

THE IDEALS AND FUNCTIONS OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS

PRESIDENT'S ADDRESS

XVII International Congress of Medicine
London, August, 1913.

Aldred Scott Warthin, Ph.D., M.D.,
University of Michigan, Ann Arbor.

With this meeting in London, held in conjunction with the XVIIth International Congress of Medicine, the International Association of Medical Museums enters upon the seventh year of its existence, and achieves its second international triennial meeting. From its small beginnings as a little group of pathologists and anatomists especially interested in demonstrative and objective teaching, the society has grown into a membership of over two hundred, and contains on its rolls the names of the majority of the world's leading workers in pathology and anatomy. It has initiated and conducted a number of successful and highly interesting meetings, all of these, up to the present time, having been held in the United States under the auspices of the American branch. Today's meeting is the first one to be distinctly international in character, and through it it is hoped that the Association may complete its international organization, and enter upon that broader field of work and influence we believe to be peculiarly its own.

It is fitting at this time to bring up for discussion the ideals and functions of this society and to determine its especial right to existence. The unceasing multiplication of new associations may well make us hesitate before launching another venture. It has become an all-too-common thing for any small body of individuals having a certain community of thought and interests to become convinced of its own especial need for a separate and close organization. Undoubtedly the lines demarcating many of these organizations are a little too finely drawn and without thorough justification. The demands made upon any medical worker, even moderately successful in his line, for membership fees and dues, contributions to programs, expenses of attending meetings, subscriptions to journals and bulletins have become undoubtedly burdensome; and the expressed wish is often heard that the number of societies be diminished rather than increased. With this point of view I am wholly in sympathy; but I believe that the Association of Medical Museums does meet a need that no other existing organization attempts to fill, and that this need is not the narrow one of a small and limited body of specialists of the medical museum alone, but that of *the whole broad field of objective and demonstrative teaching.* This to my mind constitutes the peculiar function of this society, and its ideals should be the thorough working of this field. In achieving this its endeavors should be carried along the five following lines: 1, The Medical Museum; 2, The Research Museum; 3, The Public Museum; 4, Methods of Technique; 5, Methods of Demonstrative Teaching. These will be discussed in order.

I. The Medical Museum.—The original plan of the founders of this association contemplated, perhaps, no greater field of activity than that of the museum of the medical school, a collection of typical and rare pathological and anatomical specimens and preparations to be utilized in the didactic activities of the school. All that pertained to the preservation and mounting of such specimens in the best and most illustrative manner, methods of preserving color, injection, the manner and arranging of exhibits, types of museum cases, labelling, cataloguing, etc., were considered to lie within its especial province, and papers and demonstrations of this kind formed the subject matter of the presentations and exhibits made at the earlier meetings of the association. The society was also to serve as a medium of exchange of specimens between different museums.

The importance of the *medical museum* in the teaching of medicine cannot be over-estimated, but such museums have been sadly neglected by the present generation of medical teachers in the United States at least. Not one of the better-class medical schools has any museum worthy of it. The valuable collections of our predecessors, while consisting largely of anatomical preparations, bones, monsters and other spectacular specimens, have been allowed to disappear as the result of neglect and indifference, and nothing better has taken their place. The anatomical collections are usually much better than the pathologic, but no one of our schools has a medical museum comparable to that of McGill, and few of them attempt any museum demonstrative teaching.

That our medical teaching loses in effectiveness because of the lack of proper museums and museum teaching we must admit. It may be explained by the over-accentuation of research and investigation, and the demands made upon medical teachers in this direction at the expense of thorough medical teaching. But the fact that this association had its birth in the United States and has steadily grown there may be taken as proof of an increasing interest in the development of the medical museum. To McGill University directly we are indebted for the inspiration that led to its foundation. This society should serve then as advisor and guide in developing and stimulating such museums; it should act as a clearing house for the exchange of experiences in matters of museum technique and museum teaching, and as a medium of exchange between museums.

II. The Research Museum.—There should be developed also museums or collections of the material used in research by workers of a given country or from the whole world. Original or duplicate preparations, slides, records, photographs, drawings, etc., should be collected at central or easily accessible bureaus where other workers can study them or compare them. Useless duplication of work would thus be avoided, and a better control of results obtained. From the historical side such research collections would also be of great value. Rare specimens can be seen and studied, comparisons made, and differences in interpretation checked by means of such collections. The value to both general and special students of such research exhibits as the embryological series accessible in the collections of Minot, Mall, and Huber of Ann Arbor cannot be over-estimated. Records of the development and evolution of ideas in any branch of medicine, as in the case of new surgical instruments or new operative procedures, new diagnostic methods, new appliances, etc., would form suitable material for such research museums.

III. The Public Medical Museum.—The efforts of this association cannot stop with the teaching and research museums of the medical schools. Today another and as important a field lies before us inviting our coöperation and earnest endeavors:—the field of public instruction through museums and exhibits illustrating all of those facts concerning health and disease that should be the intellectual possession of every human being, if disease is to be finally conquered and driven from the earth. During the last decade there has advanced with gigantic strides, almost magically, the conception of the prevention of disease, a philosophy and a truth appealing to the human mind as no other idea has ever done. The public health campaigns instituted by those who have been the first to realize the meaning of *preventive medicine* have from the very first used as their chief educational means the illustrative and demonstrative teaching methods of the museum. The anti-tuberculosis campaign throughout the entire world has carried on its most effective educational work through the tuberculosis exhibits. Following the International Congress on Tuberculosis held in 1908, a tremendous impetus was given to such popular museum teaching throughout the United States. Not only has tuberculosis in all of its aspects been presented thus objectively and demonstratively to the layman's mind, but likewise the propaganda against malaria, typhoid fever, infant mortality, milk infections, infant blindness, occupational diseases, venereal diseases, and all the other preventable diseases have been effectively presented through the medium of public exhibits and museums.

Such popular teaching museums have been instituted by physicians who have seen the truth and have had the vision; they have been developed by various associations and societies started by the enthusiasm of such medical men. Today the local and State Boards of Health have taken up such educational work and are carrying it on in a most effective manner. In a number of the central states the travelling exhibit has been developed as a part of the educational work of such boards. Cars or even entire trains forming museums representing the most important facts of personal and public hygiene and preventive medicine are regularly sent on tours along the railroad lines traversing the state, stops being made at every village, town and city on the line. The success of these travelling exhibits has been wonderful, and the response from the public proves beyond any doubt the legitimacy of such educational museums and the appreciation of such exhibits.

I believe that in America, at least, there is a tremendous future for the Public Medical Museum. The ignorance of the average layman about his own body is almost pathetic, and accounts for the strong hold upon the lower classes exercised by the so-called anatomical museum of the quack-doctor. How much better it would be for humanity if every large city possessed a scientific municipal museum with one section—a chief one— devoted to an explanation and exposition of the human body, as well as of the facts relating to the prevention of diseases! Few things at the Hygienic Congress in Dresden attracted so much favorable mention from medical visitors or gave so much impressive teaching to laymen as the building devoted to the human body, which contained exhibits explaining in detail the gross and microscopic structure of the human organism, its physiologic functions, the processes of reproduction and development, etc., all shown in the clearest and most objective manner. No wonder that crowds constantly awaited their turn to see this wonderful exhibit. I believe that few things would do more for the good of the race than such an exhibit placed in every large city.

In the initiation of such popular museum teaching and in the preparation of such exhibits this association has the most vital interest and should take an active part. Such museums must have the most careful planning, they must possess the most accurate scientific data, and they must have the constant supervision of men of scientific medicine. They cannot be left to the layman alone, or even to the man who has had only a public health education. Everything that concerns objective and demonstrative medical teaching and museum technique must be applied to these popular medical museums; and this association has a duty in respect to the development and management of such museums that it cannot afford to neglect, if it reaches its fullest measure of usefulness. I believe that in America the State Universities should take first place in the development of such educational museums, and the trend in this direction is already shown by the active participation of University Extension departments in the public health propaganda.

IV. Microscopic Technique.—Closely associated with museum technique and with the technical methods employed in museum teaching is the whole field of microscopic technique. Surely research in this direction is as important as in other lines of so-called pure research. It will be impossible for the latter to advance without the constant invention and discovery of new technical methods. There should be some especial recognition of this fact and some especial association is needed to stimulate investigation in this direction. I do not know of any other society today in which methods of microscopical technique are given a prominent place in programs and in discussions. It is also difficult to find a suitable place for the publication of purely technical articles; and in the usual pathological association or medical society papers dealing exclusively with technical matters are not encouraged.

I believe that this association should enter this field and combine the discussion of microscopic technical methods with those of museum technique. So closely do the two touch each other that there is no logical separation, and the need for a clearing house of microscopic methods is as great as that for museum methods. That this is true is shown by the program presented at this meeting and by the great demand for a symposium on microscopic technique similar to the one conducted a year ago in our Bulletin on museum technique. The numerous questions relating to microscopic technique that have been sent in with reference to individual experience along certain lines show that there are many workers who would be glad to establish a common interest in technical matters and who would be glad of the aid given them by an association that would encourage the free discussion and publication of methods of microscopical technique. In America at least there is a definite need for the help which this association can give in this direction through its bulletin.

V. Methods of Medical Teaching.—As the final field suitable to the activities of this association, I would suggest that of medical pedagogy. Surely the teaching of medicine and its improvement and evolution are as important as the development of any branch of medical science. There exists today no society in which the science and art of medical teaching are taken up and discussed. Very few articles upon medical teaching appear in the medical journals. There is no branch of teaching about which so little is written and said as there is about medical teaching. That there exists a definite need for some vehicle through which medical pedagogy can obtain recognition I myself do not doubt. Whenever a group of medical teachers get together informally, discussion as to teaching methods inevitably arises, and the vague and unsatisfactory way in which such discussions are carried on shows clearly the need for some more general clarifying medium. At the meeting in Chicago a year ago the general trend of the meeting was accidentally turned along lines of medical education, and the energetic and forceful way in which the discussion of teaching principles and methods was taken up and the general satisfaction resulting from the opportunity of such free discussion showed clearly this need. I think therefore we may with profit extend the scope of this organization so that it may include not only the methods of objective and demonstrative teaching associated with the museum but also all of the problems associated with medical teaching.

These, in brief, form my conception of what the ideals and functions of the International Association of Medical Museums should be. I believe that there is a special need for such an association, that in entering this field it will not in any way be as a trespasser upon preserves already occupied, but as a pioneer in fulfilling what has never before been attempted, not only in methods and matters purely related to the medical museum but along wider sociologic lines, as well as medical ones at the present unsatisfactorily developed. We need everywhere larger and better museums, both medical and public. The public medical museum is bound to come; it is now even arising, but it must be controlled and developed by medical men rather than by laymen, and medical men must have the proper knowledge and experience for the satisfactory development of such museums. In such work this association can offer the greatest possible aid and can be of the greatest possible value.

We have met today with another object in view, the completion of our international organization. It seems particularly fitting that this association, dealing as it does with such general questions as medical education and objective teaching, should be placed upon an international basis. Particularly is this necessary if we enter the broader sociologic field of public health museums. Such matters concern the whole world. The sanitary housekeeping of any one nation concerns the sanitary housekeeping of the whole world, and the questions of public health and the education of laymen to an intelligent comprehension of such constitute an international problem. Experience of workers from the entire world must be collected and correlated. And it is along such lines that the international function of this association should be developed.

ADDRESSES

L. Aschoff—Freiburg, Breisgau.

Im Namen der Deutschen Kollegen möchte auch ich danken für die freundliche Aufnahme, die wir hier in den Räumen des Hunterian Museums gefunden haben, welches wohl keiner von uns durchwandert hat, ohne einen tiefen Eindruck von der hier in über einem Jahrhundert geleisteten Arbeit für sein ganzes Leben mit hinweg zu nehmen. Wenn nun die Zahl der deutschen Kollegen, welche sich der Internationalen Vereinigung angeschlossen haben, noch eine relativ geringe ist, so beruht das nicht etwa darauf, dass das Interesse an der Museumsarbeit und dem Museumsunterricht in Deutschland fehlt, sondern vielmehr auf einer verschiedenen Bewertung dieses Unterrichtes, der bei Ihnen durch die Tradition in ganz anderer Weise ausgebildet worden ist, als das bisher in Deutschland möglich war. Dafür legen all die grossen und so übersichtlich eingerichteten anatomischen und pathol.-anatom. Museen Ihrer grossen Spitäler in denen sich die wissenschaftlichen Schätze vieler Jahrhunderte häufen, beredtes Zeugnis ab. Das Museum bildet sozusagen das Zentrum des wissenschaftlichen Lebens innerhalb des ganzen Spitals, und es ist wohl kein Zufall, dass die erste und erfolgreiche Anregung zu einer englischen Universität Nordamerikas, McGill University, ausging. Durch diese zentrale Gestaltung ihrer Museen auf den englischen zum Teil auch amerikanischen Unterrichtsanstalten wird es Ihnen auch leichter gemacht die weitgehenden Ziele zu verfolgen und zu verwirklichen, die sich diese Vereinigung nach den anschaulichen und klaren Ausführungen unseres Präsidenten gesetzt hat. Aber Sie müssen bedenken, dass Ihnen auf englischem und amerikanischem Boden die Durchführung solcher Aufgaben dadurch weiter erleichtert wird, dass Sie nicht an staatliche Unterstützung gebunden, mit Hülfe privater Mittel in viel leichterer Anpassungsfähigkeit an die gegebenen Umstände ihren Unterricht bald streng wissenschaftlich, bald mehr populär gestalten können. Auch bei uns hat man—und zwar mit grossem Erfolg auf der Dresdener Ausstallung mit einem auf wissenschaftlicher Grundlage sich aufbauenden, für das Volk bestimmten Anschauungs-unterricht begonnen. Aber diese Unternehmungen stehen nicht in direkter Beziehung zu den Universitäten, und von der Schaffung einer all diese Bestrebungen umfassenden Zentrale, in welcher die Universitäten die beratenden aufsichtsführenden Behörden darstellen konnten, sind wir wegen der rein staatlichen Bestaltung unseres Universitätsunterrichtes noch weit entfernt. Das Wichtigste scheint mir daher zu sein, dass überhaupt erst einmal in den verschiedenen Ländern grössere Kreise der Kollegen bezw. der Behörden für die Bestrebung der Internationalen Museumsgesellschaft interessiert werden. Wir haben das in Deutschland damit zu erreichen versucht, dass wir zunächst einmal seitens der Deutschen pathol. Gesellschaft alle Mitglieder zugleich zu Mitgliedern des Deutschen Austauschvereins in Frankfurt, M., der ja sozusagen ein Zweigverband des internationalen Verbandes sein soll, gemacht haben. Aber es fehlen so gut wie völlig die Anatomen, Kliniker, Vertreter der staatlichen Behörden, etc. Die Arbeiten des Austauschvereins sind ja auch mehr umschriebener Art und etwas andere, als die der Internationalen Museumsgesellschaft, welche eben Wert darauf legt, durch internationalen Gedankenaustausch die neuesten und besten Methoden der Museumseinrichtungen und des Museumsunterrichts sowohl für rein wissenschaftliche Zwecke wie für das Volk allen bekannt zu machen, und durch Veranstaltung von Internationalen Museumsausstellungen die Errungschaften praktisch vorzuführen. Es müssen vor allen also neben der bis jetzt eigentlich allein arbeitenden amerikanschen Zweigabteilung in allen übrigen Ländern lebenskräftige Zweigverbände der Internationalen Gesellschaft geschaffen werden, und ich glaube dass das nur durch eine bessere Propaganda erreicht werden kann. Die bisher üblichen Zusendungen der englisch gedruckten Bulletins sind deswegen nicht ausreichend, weil sie vielfach nicht gelesen werden, sondern ich glaube, dass die von der Sekretärin versandten Mitteilungen durch die in den einzelnen Ländern bestehenden Zweigverbände in die betreffende Landessprache übersetzt und dann den Mitgliedern mitgeteilt werden müssten. Das würde sich allerdings erst lohnen, wenn bereits eine grössere Zahl von Mitgliedern der internationalen Gesellschaft angeschlossen sind. Oder noch besser, wenn alle Zweigvereinigungen mit ihren ganzen Mitgliedern der Internationalen Museumsgesellschaft beitreten. Das geht vorläufig für die Deutsche Pathol. Gesellschaft, die hier zunächst allein in Frage kommt, solange nicht, als der Beitrag der internationalen Gesellschaft noch 2 Dollar beträgt, was für die jüngeren Mitglieder der Gesellschaft ein zu grosses Opfer bedeutet. Wenn aber erst in allen europäischen Ländern nationale Zweigvereine bestehen und diese sich mit den verschiedenen wissenschaftlichen Gesellschaften, die in dem betreffenden Lande in Betracht kommen, in Verbindung gesetzt haben, lässt es sich vielleicht ermöglichen, durch eine bestimmte, auf die einzelnen Zweigabteilungen fallende jährliche Quote die Ausgaben der internationalen Gesellschaft, die auf rund Mk. 1000.— geschätzt werden beizubringen. Jeder nationale Zweigverband hätte dann von sich aus die betreffende Summe entweder von den verschiedenen wissenschaftlichen Gesellschaften oder direkt von den einzelnen Mitgliedern einzufordern. Jedenfalls ist die Gründung von solchen Zweigverbänden, die zunächst einmal die Agitation zu betreiben hätten, das Wichtigste. Ich möchte daher vorschlagen, dass die Ansprachen des Präsidenten, die Ausführungen des Herrn Osler und der Bericht der Sekretärin auch in deutscher, französischer, und italienischer Sprache gedruckt und durch bestimmte Vertrauenspersonen in den einzelnen Ländern, in Deutschland durch den Sekretär und Schatzmeister des Austauschvereins in Frankfurt/M., Prof. Fischer, den interessierten Wissenschaftlichen Gesellschaften und Einzelpersonen zugängig gemacht wird. Dass ferner womöglich noch hier in London für jedes Land je ein Berater bestimmt wird, welcher unserer Sekretärin eine Liste der besonders in Betracht kommenden Kollegen übersendet, bei welchem man Interesse an unseren Bestrebungen voraussetzen darf, damit dann den betreffenden Persönlichkeiten das jetzt im Druck befindliche Bulletin No. 3 geschickt werden kann. Sobald die Gründung der nationalen Zweigvereine überall stattgefunden hat, wären dieselben aufzufordern, bis zur nächsten Generalversammlung der Internationalen Museumsgesellschaft auf dem nächsten internationalen Med. Kongress passende Vorschläge für einen weitgehenden Anschluss der Mitglieder wissenschaftlicher Gesellschaften und staatlicher Behörden unter Berücksichtigung möglichster Herabsetzung des Jahresbeitrags vorzulegen. Dann dürfen wir hoffen, dass die von den englischen und amerikanischen Kollegen gegebene Anregung tatsächlich von Erfolg gekrönt sein wird.

ORIGINAL COMMUNICATIONS

General Articles

PUBLIC SERVICE IN THE UNIVERSITY AS A MEANS OF AIDING MEDICAL RESEARCH.*

By Dr. J. G. Fitzgerald.
Department of Hygiene, University of Toronto.

The particular public service which has been undertaken by the Department of Hygiene of the University of Toronto, is the preparation of biological products; so far diphtheria antitoxin and rabies vaccine, the so-called Pasteur treatment.

The method of undertaking this public service is as follows: To the present time, in Canada, biological products such as those named have been obtainable only in the ordinary way from commercial houses whether those who used them were private practitioners or boards of health. The cost of this service has been for the public at large very considerable, for the larger municipalities with isolation hospitals, much less. Investigation has shown that the burden in this direction has fallen most heavily on those least able to bear it.

Agitation for some time has been carried on to the end that the Federal Government undertake the preparation of these products and the Federal or Provincial Governments arrange for their distribution free of charge to those unable to pay. As a substitute for this the University of Toronto, through its Department of Hygiene, has undertaken the work but has modified the manner in which the service is to be accomplished.

First it is believed that such a public service is in the interest of Hygiene and Preventive Medicine since the infectious diseases are problems of public health. Secondly it is felt that more can be done than simply supplying indigents with the necessary treatment. For that reason arrangements have been made with the Provincial Board of Health of Ontario to undertake the distribution of diphtheria antitoxin at an exceedingly low price. This low price will not only apply to boards of health, but to all who have occasion to use this therapeutic agent. Indigents and those to whom even this small amount is a hardship are provided for by their municipalities. The local boards of health obtain antitoxin at a very small cost and the great mass of the people previously burdened, very often with excessive accounts for antitoxin, are now able to obtain it, pay for it, maintain their self-respect, not be pauperized and are able to have for use the large doses often-times necessary. As Professor Benjamin Moore has pointed out; there are two classes of people today well provided with medical care and attention, the very rich and the very poor, whereas all the rest are likely to find it a hardship if any amount of medical care is necessary. These are the people who have found it a burden to pay high prices for antitoxin. They are not indigent, but they have limited means. Their slender purses are flattened out after paying for ten or twenty thousand units of diphtheria antitoxin at ordinary commercial prices. Also let us recall that these people are in no wise benefited by any of the ordinary plans for distributing antitoxin free to indigents, or at slightly lowered prices through Boards of Health. These people are not paupers, are not cared for by the Boards of Health, but they are the large part of our population.

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*Read at the meeting of the International Association of Medical Museums, Toronto, April 9th, 1914.

In many places antitoxin is sold through the state or local board of health at slightly reduced prices by commercial firms. This is an advantage as far as it goes. But we plan to go farther, if possible, to include everyone, and to reduce the price to practically cost.

Now as to the other aspect of the question:

There are research institutes today where a great portion of the revenues come from the sale of biological products. For example, the Pasteur Institute, Paris, and the Lister Institute, London. Neither of these has modified the usual commercial method of distribution. In the University of Toronto the venture is expected to be self-supporting and those engaged in the supervision of the work are to have time for research and teaching. The President of the University has expressly pointed out that adequate time for research is to be planned and the support thereof to come from a public service which it is hoped will be a distinct step forward in the direction of social reform as it relates to the public health. Also, an additional means of providing for research in a direction in which all agree it is desirable to proceed.

THE PUBLIC HEALTH MUSEUM, ITS POSSIBILITIES AND USES.*

H. E. Robertson, Minneapolis.

Study of the development of the museum idea is, in a broad sense, a study of the cultural, scientific and commercial development of civilized people. Taking its name from the Greek "Museion" meaning "Temple of the Muses," the word came to mean a place for study and, among the Greeks, represented a center of culture and learning. In later years the word received a more limited application and was used to designate a building where collections of literary and natural curiosities were housed.

Gradually the practical application of the museum idea obtained recognition and now, not only commercial museums but also teaching and research collections representing almost every activity of man and nature, are world-wide in distribution and prominence.

The idea of this word borrowed from the ancient Greeks, has not only fully come into its own but has been widely developed and broadened. History, art, letters, commerce, natural and applied sciences, invention, racial customs and national achievements are accepted as subjects for illustration by collections, which are legion in their number and amazing in the variety of their classifications.

Rather late in its growth and development the college museum is only recently receiving the attention it so justly deserved. As an important adjunct to teaching and research, as an unrivalled method of demonstration and inspiration, its sphere of usefulness is almost unlimited. In no one field of University training can it play a more important part than that of teaching the science and art of medicine. No Medical school is now deemed complete without a collection of specimens which illustrate the various developmental defects and pathological changes occurring in the animal body. Originally designed as a group of strange, bizarre and unusual freaks, we are now recognizing that "to see the thing as it really is" constitutes a most important adjunct in fixing the student's attention and enlarging his ideas about disease not only the more rare and uncommon types but every condition in which a specimen, gross or microscopical, pictured or modelled, can illustrate some appreciable change from the normal.

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*Read at the meeting of the International Association of Medical Museums, Toronto, April 9th, 1914.

The natural result of this widely accepted method in Pathology and Anatomy is its application to the teaching and demonstration of those principles and laws which are embraced in the modern subject of Preventive Medicine or Public Health. The wonderfully rapid growth of this important field of medical work, its ever increasing range of application and complexity of its inter-related branches, have nearly outstripped any plan for the rational development of the subject. Almost with a gasp we view the tremendous momentum of this movement, and wonder about its possibilities for even the next decade. The science of forestalling disease, the increase of state and municipal paternalism in matters of civic welfare, and the sweeping away of the cobwebs of superstition and ignorance in the collective people's mind, involve conceptions of future achievement in the fight against human misery which might well stagger any imagination that endeavours to foretell the final outcome. Expansion of this branch of medical teaching is almost literally being forced upon medical schools and in this expansion it must readily be perceived that the public health museum is destined to play a prominent part. One only needs to consider the revelation afforded by the Hygiene exhibition at Dresden in 1911 to be impressed with the value and service of such an exhibit as a fixed institution.

For a number of years travelling "exhibits" have been used for conveying to the public, concrete ideas in regard to those matters which affect their welfare, but as yet a permanent museum for this purpose as a civic or university need, has only been vaguely felt and imperfectly realized. Its ideal organization involves a recognition of the various classes of individuals affected by the work of a school of Public Health. To the first and most prominent group, at least for the present, belongs the student of medicine. Next in the rank of importance and possibly having rights to a future first place in our plans, comes the future trained health officer. Then, the general student body, a privileged class of whom much must be demanded for the future in raising the general level of communal knowledge and ideals. Last, but certainly not least, comes the general public, that great body of citizens on whom ultimately must always rest the final decision when questions of their own interests are involved. All of these divisons are concerned in the upbuilding of a properly arranged school or department of public health, and the museum in *its* development may appeal appropriately to each class.

One only needs to analyze the curriculum of one of our modern public schools to realize the possibilities and wide range of sources for material. However, owing to the numerous branches of this curriculum and their closely interwoven lines of correlation, it seems best in the description of such a museum to classify its possible exhibits according to their physical character.

For one of these classes, of necessity, illustrations must play a very important part. The diagnostic features of contagious disease, the results of venereal infection, deformities and disease of children in relation to school inspection, bacteria, flies, mosquitoes and other agents in the transmission of plagues, all might be emphasized clearly and admirably by photographs, coloured lantern slides and drawings.

Charts showing morbidity and mortality, statistics of transmissible diseases and their geographical distribution, the hereditary importance of alcoholism, venereal diseases and other eugenic factors, statistics of small pox and typhoid vaccinations, the results of the cultural method of handling diphtheria epidemics and numerous other allied subjects, would furnish abundant material for instruction and research. Samples of various blanks for reporting epidemics, deaths, births and other vital statistics together with appropriate filing systems are essential as examples of administrative requirements.

Collections of laboratory apparatus and supplies constitute another important group. Under this might be mentioned, microscopes and accessories, culture media, field outfits for collection of milk and water samples, sputum cups, animal cages and special apparatus for carrying out various diagnostic procedures.

Perhaps the division composed of the numerous *models* of apparatus used in public health work might be considered the most important . If the miniatures illustrating all of the branches were gathered in one place the array would be imposing. Among the less complicated would be those of different types of modern dwellings, school houses and factories, each standing for the best in its own field, while methods of ventilating, heating and lighting these houses, schools and large buildings ought to be included. Advancing into the realm of sanitary engineering the miniatures would become more complicated, but no museum of this kind would be considered complete which did not include models of septic tanks and other approved methods for the disposal of sewage. The principles governing the purification of water supplies for both emergency and permanent use, must also be illustrated; the former perhaps by a sample hypochlorite plant and the latter by suitable models. Much space could be devoted to the subject of the prevention of contamination of both public and private water supplies and for this purpose models and illustration could be combined to great advantage. By this means also, properly constructed refrigerators, cold storage plants and the handling and preservation of food products could be presented. In the same manner a sanitary dairy, pasteurizing plant and other methods involved in the distribution of milk would serve to educate both the sanitary inspectors and the public.

Time will not permit me to go further into detail regarding other and perhaps equally important possible exhibits. Sterilization and disinfectants and their uses, army and navy hygiene, data concerning the laws of personal hygiene, school inspection, its methods and results, are all subjects which deserve a place in such a scheme.

I am sure that in this brief survey, the possibilities and uses of the Public Health Museum are sufficiently outlined. Like all museums, its growth must be gradual along definite preconceived plans with proper housing and cataloging facilities and with the constant aim in view of education, research, and stimulation of the public conscience.

The establishment of such a museum acording to the plans just described, has just been initiated at the University of Minnesota. The work is still in its infancy and the future possibilities too little understood to justify any more than a modest beginning.

While I am not certain of the exact relation such museums should bear to the International Association of Medical Museums, it would seem to be a rational conclusion that they are destined to become an important adjunct to the teaching of medicine and its allied branch, Public Health. If this Association is to fulfil the promise of its organization, this newer movement must be fostered and encouraged to develop according to those scientific ideals for which we stand.

THE EXPERIMENTAL METHOD AS UTILIZED IN THE CLINICO-PATHOLOGICAL CONFERENCE.*

By Howard T. Karsner, M. D., Boston, Mass., U. S. A.

Experience with the experimental method as a regular part of the course in pathology has demonstrated its value. How much time shall be allotted to this type of work remains a problem for each director of the undergraduate work in pathology. The same is true in regard to the degree of participation by the student in such exercises. A scheme for the participation of students in the actual performance of experiments has been outlined in a previous paper[1] and has been operated successfully for three years in the Harvard Medical School. Criticism has been offered to the effect that much of the technique necessary to carrying on the work must be learned by some of the students and that they readily forget these details. This is probably true, but time limitations are such that a course of this kind cannot have as its function instruction in technical procedures to large classes. The participation of the students must have for its purpose contact with experimental procedures, not so much for the technique as for the point of view which it engenders. This point of view has its value not only in pathology but in all the work of the medical course and it is a point of view that cannot be gained by observation of the results of others nearly so well or so permanently as by actual participation, a truism that forms the basis for all laboratory training. In its ultimate analysis, experimental pathology means simply the adoption by the trained pathologist of the methods of physiology, chemistry, surgery, immunology and bacteriology. The teaching of experimental pathology then is simply the utilization of these methods in explaining the processes and products of disease. Properly applied, this form of teaching does not ignore the anatomy and histology of the lesions; on the other hand it emphasizes the importance of the lesions by showing simultaneously the correlated functional change. It is difficult for the bio-chemist and physiologist to make extensive clinical application of their work in the undergraduate courses because the students at that stage in the graded course have little or no knowledge of pathological anatomy. Hence, the teaching of pathological physiology in its broadest sense devolves upon the experimental pathologist. The gap between the clinic and the fundamental sciences is one of the penalties of the graded course and even with the institution of work in experimental pathology it is not completely bridged. Unfortunately, from this particular point of view, much of the work in the fundamental sciences is taught with reference to pure science rather than to the applied science of medicine, and in many respects this is necessary. To overcome this difficulty various schemes have been devised, such as the new method of examinations in the Harvard Medical School whereby it is necessary for the student to pass a general collective examination in all the subjects of his first two years at the end of that period, and in all the subjects of the second two years at the end of his course, and there can be no question of the value of this particular scheme. Uniformity of ideals on the part of teachers and close coordination of the teaching of the fundamental sciences and of the clinical branches can do much to aid the student in correlating in his own mind all the subjects of the medical curriculum. The necessity for such close coordination of teachers has been made the basis for the appointment to the Children's Hospital in affiliation with the Harvard Medical School of the heads of the departments of bacteriology, bio-chemistry, pharmacology, physiology and experimental pathology; the heads of these scientific departments to have rank of the visiting physicians and surgeons. This cannot but react beneficially on the work of the school and the hospital and to the mutual advantage of physician, student and patient, in regard to diagnosis and treatment as well as teaching and investigation. It must have been the same spirit of cooperation that led to the establishment abroad and in this country of the various exercises in clinicopathological correlation. With the modern development of the fundamental sciences and the institution of undergraduate work in experimental pathology such exercises have become inadequate and it becomes necessary to include in such conferences the related alterations of function. It would be well if the conferences could command the services of workers in the various special fields and it is hoped that the future will produce such a cooperative scheme, but at the present time the experimental pathologist is obliged to fill in the details of processes and functions which are necessary to make clear the relation between the pathological lesions (including their relation to each other) and the clinical case. That such a scheme is practicable is illustrated by the account of the exercises which have been conducted by the writer with the invaluable aid of Dr. Francis W. Peabody whose clinical material in the service of Dr. H. A. Christian at the Peter Bent Brigham Hospital has been utilized to the fullest degree, and whose sympathy and aid have made the fulfillment of the idea possible. As will be seen, Dr. Peabody has taken an active part in each exercise.

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*Read at the meeting of the International Association of Medical Museums, Toronto, April 9th, 1914.

[1] Karsner, H. T., The Function of the Experimental Method in the Course in Pathology, Boston, Med. & Surg. Jour., 1912, clxvii, 531.

The exercises outlined require the affiliation of the school with an active hospital, in which clinical cases are studied intimately, careful records kept and autopsies performed upon a large number of fatal cases. The exercises, as conducted, were irregularly interspersed in the course in pathology, necessarily so because they depended upon seizing opportunity as material came to hand. They can be arranged more regularly by the accumulation in the pathological department of gross material from suitable cases. Every large hospital usually has in its wards the clinical cases demanded in the exercises. The success of the first exercise, whose outline follows, stimulated the planning of the equally successful subsequent exercises. The exercises occupied about three hours, a rest period of ten minutes being provided at the end of each hour. Such exercises presuppose considerable preliminary work on the part of the students and it has therefore been considered unwise to attempt them until the students have had eight weeks of work in pathology as conducted under the concentration method employed in this school.

Exercise I. Aortic Valvular Disease.

A. Seven formalin preserved human hearts showing aortic disease were given to seven pairs of students; the hearts were studied and the students were quizzed by Dr. Karsner in the presence of their classmates, the entire class taking part in the conference on each specimen.

B. Demonstration of physiological tracing of pulse and blood pressure from a dog with experimental aortic stenosis. The demonstration was by the five students who had participated in the experiment, and the students were reminded that they had listened with the multiple stethoscope to the murmur in this animal.

C. Demonstration by students of physiological tracing of pulse and blood pressure from a dog with experimental aortic regurgitation.

D. Demonstration by Dr. Peabody of a human patient with double aortic murmur. Students listened to murmurs with multiple stethoscope.

E. Reading of case history of a case of aortic stenosis and summary by Dr. Peabody. Demonstration by Dr. Karsner of the fresh autopsy material from this case. Conference on the pathological anatomy, physiology and clinic of this case by Drs. Karsner, Peabody, and class.

EXERCISE II. ARTERIO-SCLEROSIS.

A. Demonstration by students of ten gross specimens of arterio-sclerosis; conference.

B. Demonstration by students of adrenalin arterio-sclerosis in the rabbit. Conference on the theories of the development of arterio-sclerosis, including brief discussion of cholesterol sclerosis and lactic acid sclerosis.

C. Demonstration by Dr. Peabody of a case of syphilitic arterio-sclerosis (aortitis).

D. Case history and summary by Dr. Peabody of a case of syphilitic arterio-sclerosis with aortic regurgitation; demonstration by Dr. Karsner of fresh material from this case.

E. Demonstration by Dr. Peabody of radiographs from a case of peripheral arterio-sclerosis.

F. Case history and summary by Dr. Peabody of a case of peripheral arterio-sclerosis; demonstration by Dr. Karsner of fresh autopsy material from this case.

G. General conference.

EXERCISE III. DIABETES MELLITUS.

A. Fifteen minute review by one of the students of normal carbohydrate metabolism.

B. Discussion by five students on the basis of their own experiments of the influence on carbohydrate metabolism of pancreatectomy, subcutaneous injections of adrenalin, of morphin and phlorrhizin and of puncture of the floor of the fourth ventricle.

C. Conference directed by Dr. Karsner on the pathological histology of diabetes mellitus on the basis of material studied during the regular course.

D. Résumé of the pathological physiology of diabetes mellitus in its relation to clinical medicine by Dr. Peabody and exhibition of case of diabetes mellitus of protein origin with complete correllated dietary and urinary charts.

EXERCISE IV. NEPHRITIS.

A. Demonstration by students of seven specimens of chronic nephritis.

B. Reports by students of the acute nephritis of the rabbit produced by uranium nitrate, potassium chromate, cantharidin, diphtheria toxin, sodium tartrate.

C. Demonstration by students of the simultaneous record of kidney volume, blood pressure and urine flow of a normal dog and discussion of the pathological variations in acute nephritis.

D. Discussion by Dr. Peabody of the phenolsulphonephthalein functional test.

E. Report by students on basis of their own experiment of retention of non-protein nitrogen in the blood in acute nephritis produced by sodium tartrate.

F. Demonstration by Dr. Peabody of case of chronic nephritis.

G. Case history and summary by Dr. Peabody of a case of chronic nephritis with heart hypertrophy; demonstration by Dr. Karsner of the fresh autopsy material from this case.

Similar but necessarily somewhat briefer exercises were conducted on the subjects of pneumonia and of cirrhosis of the liver.

THE SIMULTANEOUS STUDY OF GROSS AND MICROSCOPIC PREPARATIONS IN THE TEACHING OF PATHOLOGY.*

By Dr. Henry Albert,
University of Iowa, Iowa City.

The usual laboratory course in pathology consists of the study of microscopic preparations. Gross specimens are demonstrated in connection with lectures and recitations or are more carefully studied in connection with autopsy or museum teaching courses.

There is no doubt but that the fundamental principles of pathology are better studied from microscopic than from gross specimens. On the other hand, it is more important that the practicing physician be able to apply his knowledge of gross rather than microscopic pathology. It is of fundamental importance that when a physician observes a lesion with the naked eye, he should, in his mind's eye see a picture of the microscopic change —the nature and extent of involvement of the cells.

This, it seems to me, can best be accomplished by a simultaneous study of gross and microscopic preparations. The student should first study the gross and note the changes in size, consistency, color, etc., of the specimen and immediately afterwards should study the histological pathology and see what tissue changes have occurred to bring about the gross features. We have applied this method in our work at the University of Iowa for the past five years and find that the students learn their pathology, retain their knowledge of the subject and are able to apply it to their clinical work much better than formerly, when their courses in gross and microscopic pathology were presented separately.

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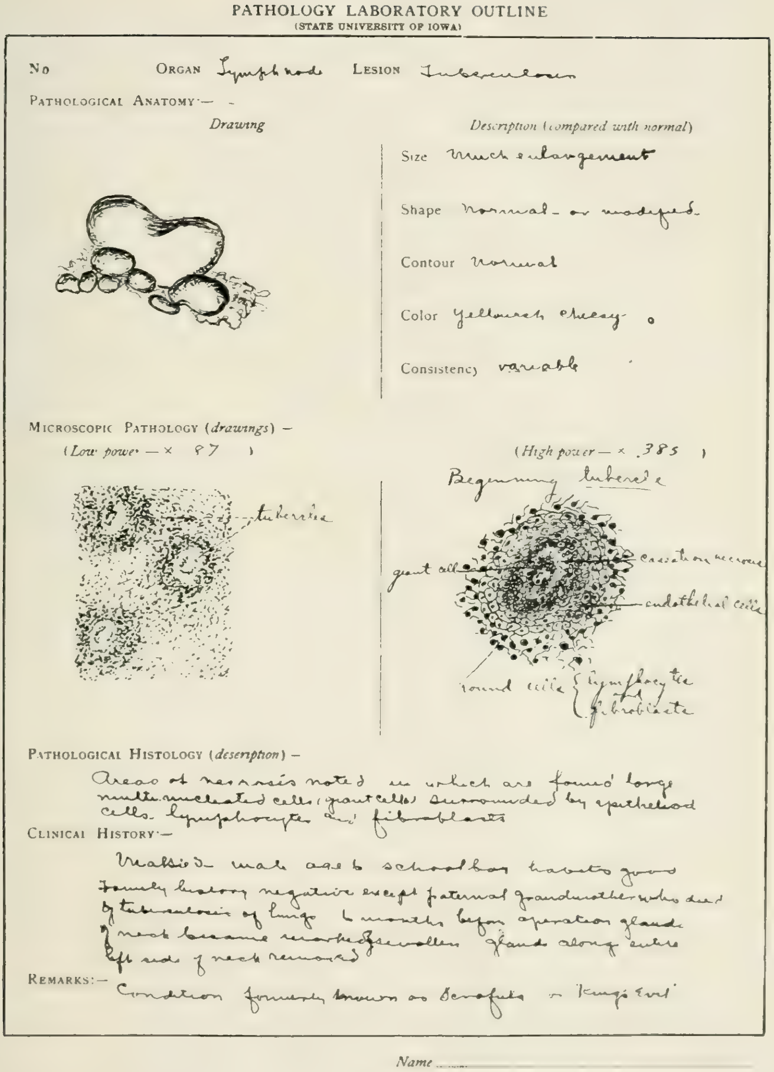
* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, Mo., April 1st, 1915.



PATHOLOGY LABORATORY OUTLINE
(STATE UNIVERSITY OF IOWA)

No ORGAN Lymph node LESION Tuberculosis

PATHOLOGICAL ANATOMY —

Drawing

Description (compared with normal)

Size Much enlargement

Shape Normal – or modified.

Contour Normal

Color Yellowish cheesy

Consistency variable

MICROSCOPIC PATHOLOGY (*drawings*) —

(*Low power* — × 87)

tubercle

(*High power* — × .385)

Beginning tubercle

giant cell

caseation necrosis

endothelial cells

round cells { lymphocytes and fibroblasts

PATHOLOGICAL HISTOLOGY (*description*) —

Areas of necrosis noted in which are found large multinucleated cells (giant cells) surrounded by epithelioid cells, lymphocytes and fibroblasts

CLINICAL HISTORY —

Walter D. male age 6 schoolboy habits good. Family history negative except paternal grandmother who died of tuberculosis of lungs. 6 months before operation glands of neck became markedly swollen. Glands along entire left side of neck removed

REMARKS: — Condition formerly known as Scrofula or 'King's Evil'

Name ....

FIG. 1

To illustrate a little better the point that I desire to make, let me refer briefly to the note-book which our students use. The note-book is in the form of a bound volume. The first portion of it represents a number of printed pages devoted to "General Laboratory Directions," "Laboratory Technique," "Autopsy Protocol Notes" and an "Index." In the index, the various specimens are arranged in alphabetical order according to both the lesion and the organ involved. The number following the name represents the number of the specimen,—the various specimens having been so arranged as to be presented in numerical order. Additional specimens may be inserted at any place and designated by the additional use of a letter. The remainder of the book consists of outline sheets—a page of which is devoted to each specimen studied. About 600 specimens are studied in the course.

The upper part of the outline sheet has a place for the number of the specimen, name of the tissue involved, and the lesion. Then comes a space for the drawing of the gross specimen. This drawing should be outline in character—it being sufficient to represent the pathological process and to indicate its relationship to the tissues or organ as a whole. It is not supposed to be an artistic drawing and need not require much more than a minute to complete. The making of the sketch causes the student to study the gross specimen more carefully than he otherwise would. Opposite this drawing is a space for brief notes on the size, shape, surface contour, color and consistency of the specimen. Below the drawing and description of the gross specimen are spaces for two drawings representing the pathological histology. The first of these,—the low power drawing—representing a magnification of about 75, is designed to show the type of tissue in a general way, but more especially the relationship of one kind of tissue to another. No endeavor should be made to represent detail of cell structure—not even as much as may be seen with this magnification.

The high-power drawing representing as a rule, a magnification of about 450, is intended for the details of cell outline and structure. The various types of cells should be clearly differentiated. The description of the microscopic specimens should be made principally by labeling the various elements in the drawings.

Below the drawings and description of the microscopic specimen is a space for a brief clinical history. We believe that the student should learn those portions of the clinical history which have a direct bearing on the pathology—in order that there may be a proper correlation in the student's mind of the pathological findings and the clinical symptoms.

Finally a place is left for remarks—concerning the etiology, nature of the disease, chemical pathology, staining reactions, etc.

I would not have the study of gross preparations as here described take the place of a special study of the specimens in autopsy or special museum teaching courses. Such additional courses are most helpful. But I do believe that the regular courses in general and systematic pathology as usually taught, place relatively too much emphasis on the microscopic as compared with the gross findings and that the principles of pathology are more firmly fixed in the student's mind if the gross and microscopic lesions are simultaneously studied.

Museum Technique

UEBER DAS DURCHSICHTIGMACHEN VON PRAEPARATEN.*

Von Dr. Med. et LL.D. Werner Spalteholz,
ao. Professor an der Universität zu Leipzig.

Für die Darstellung der Verhältnisse im Inneren eines Organes kommen zweierlei grundverschiedene Methoden in Betracht, chemische und physikalische, die man gesondert anwenden oder auch miteinander kombinieren kann. Die chemischen Methoden beruhen auf teilweiser oder vollständiger Vernichtung von Gewebsteilen, die physikalischen darauf, dass unter Erhaltung der Gewebsteile nur deren optische Verschiedenheiten in verschiedenem Grade ausgeglichen, vernichtet werden. Jede dieser Methoden hat ihre Vorzüge und ihre Nachteile und je nach dem Zwecke, den man verfolgt, wird man die eine oder die andere wählen. Ich werde mich hier nur mit der physikalischen Methode beschäftigen und komme damit gern der liebenswürdigen Aufforderung nach, die mir von der Leitung der Sektion zugegangen ist.

Ich will dabei ganz kurz auch auf die theoretische Seite der Methode eingehen, da ich diese für interessant und besonders wichtig halte. Meiner Meinung nach müssen wir ja bestrebt sein, uns bei allen unseren Methoden von der Empirie, auf der sie zunächst beruhen, frei zu machen; wir müssen auch ihre theoretischen Grundlagen studieren und werden erst dann, wenn wir diese vollständig klargelegt haben, die Methoden selbst ganz beherrschen und mit Erfolg zu verbessern im Stande sein. Und darnach müssen wir mit allen Kräften streben, denn jeder Fortschritt in den Naturwissenschaften und in der Medizin hängt von Fortschritten in den Untersuchungsmethoden ab.

Die physikalische Methode ist eine rein optische. Sie alle wissen, dass ein Glasstab, den man in Canadabalsam steckt, fast oder ganz unsichtbar wird, und dass eine mattierte, also undurchsichtige Glasplatte, welche mit Wasser, oder besser noch Fett oder Oel betupft wird, an der betreffenden Stelle durchsichtig wird. Die physikalische Erklärung für diese Erscheinung ist folgende: ein Körper reflektiert um so mehr Licht und lässt um so weniger durchtreten, ist um so undurchsichtiger, je mehr sein Brechungsindex von demjenigen der Umgebung verschieden, und je rauher seine Oberfläche ist; er reflektiert möglichst wenig Licht, lässt alles (oder fast alles) Licht durchtreten, ist also durchsichtig, wenn der Brechungsindex dem der Umgebung gleich ist, und wenn seine Oberfläche möglichst einfach gestaltet, glatt ist.

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*Read at the meeting of the International Association of Medical Museums, London, 1913.

Bisher wusste man aber nicht, dass dieses für anorganische Körper seit langer Zeit bekannte Gesetz in entsprechender Weise auch anwendbar ist auf organisierte organische Körper. Das Gesetz schien sich auf die tierischen (und pflänzlichen) Körper nicht anwenden zu lassen, die bis in die feinsten Abschnitte hinein aus verschiedenen und teilweisse nicht nur chemisch, sondern auch optisch stark differierenden Bestandteilen zusammengesetz sind. Und doch ist dies der Fall. Es giebt nämlich für jedes Gewebe, jedes Organ, jeden Körper, mag er aus noch so vielen, chemisch und optisch differierenden Bestandteilen bestehen, einen mittleren Brechungsindex, um den sich die Brechungsindices der einzelnen Bestandteile herum gruppieren; und es verhält sich der Körper bei den Versuchen, ihn durchsichtig zu machen, optisch so, als ob alle seine Bestandteile diesen mittleren Brechungsindex hätten. Wir können daher einen Körper maximal durchsichtig machen, wenn wir ihn mit Substanzen durchtränken und umgeben, welche diesen selben mittleren Brechungsindex haben.

Es ist dabei natürlich ganz gleichgültig, ob diese Substanz die Lösung eines Salzes, ein Oel, oder ein festes Harz ist. Es kommen dabei in der Hauptsache nur Substanzen in Frage, welche einen Brechungsindex haben, der zwischen $n_D = 1.500$ und $n_D = 1.600$ liegt, in Frage, und unter diesen wählen wir solche aus, welche farblos, möglichst beständig, nicht feuergefährlich und nicht zu teuer sind. Unter den in Betracht kommenden habe ich besonders mit Wintergrün-(Gaultheria—)Oel, Benzylbenzoat, Isosafrol und neuerdings mit Safrol gearbeitet. Mit letzterem, welches einen ganz ähnlichen Brechungsindex, wie Wintergrünoel hat, farblos und billiger wie dieses ist, und welches mir als besonders beständig gerühmt wurde, habe ich einige der Präparate durchsichtig gemacht, die ich ausgestellt habe; leider scheint aber das Safrol an manchen Präparaten schneller dunkel zu werden, als das Wintergrünöl, das mit der Zeit vielfach, aber durchaus nicht immer etwas nachdunkelt.

Da die angewandten Oele sich nicht mit Wasser mischen, müssen wir die Präparate zunächst entwässern und schalten darnach am besten noch eine Behandlung mit Benzol ein, da sich nach dem Einlegen der Präparate in das Oel Spuren von Benzol besser entfernen lassen, als solche von Alkohol.

Ein wichtiger Punkt ist das Bleichen der Präparate. Dies muss im Allgemeinen maximal geschehen, mit Ausnahme der Fälle, in denen man Knochenstrukturen zeigen will; bei diesen empfiehlt es sich, nicht so stark zu bleichen oder sogar die Knochen etwas zu färben, denn bei stark gebleichten Knochen verschwindet die Struktur fast vollständig. Sonst aber bleiche ich mit Wassenrstoffsuperoxyd (häufig unter zusatz 1% Formalin), und zwar nehme ich, da ich grosse Mengen brauche, die industriell gebrauchte, saure Lösung, die ich, wo ich ihre entkalkende Wirkung fürchte, vor dem Gebrauch mit Ammoniak neutralisiere (der entstehende Niederschlag schadet nichts). Es ist nicht nötig chemisch reines Wasserstoffsuperoxyd zu nehmen, das sehr viel teurer ist. Dieses Wasserstoffsuperoxyd verdünne ich bei Embryonen und sehr zarten Objekten bis auf das Vierfache mit Wasser; sonst benutze ich es unverdünnt. Die beste Bleichung erhält man nach intensiver Vorbehandlung mit Formalin, und öfters habe ich, wenn die Bleichung nicht gute Fortschritte zu machen schien, mit Formalin und Wasserstoffsuperoxyd (ohne zwischenschaltung von Wasser) mit Erfolg mehrfach gewechselt.

Wenn die Präparate genügend gebleicht sind, dann werden sie sehr gut in fliessendem Wasser ausgewaschen und darnach in steigenden Alkohol überführt.

Eine etwaige Injektion der Blut- oder Lymphgefässe oder anderer Räume muss natürlich vorausgehen.

Als Endflüssigkeit gebrauche ich für menschliche Organe im Allegemeinen dass Gemisch von 5 Gewichtsteilen Wintergrünöl und 3 Gewichtsteilen Benzylbenzoat, das genau denselben Brechungsindex, wie entkalkte menschliche Knochen hat. Stimmt dies Gemisch nicht ganz, dann kann man es leicht ändern. Für Embryonen und jüngere Feten nehme ich reines Wintergrünöl, bei etwas älteren unter Zusatz von etwas Benzylbenzoat. Aehnlich verfahre ich bei tierischen Organen und Körpern, die im Allgemeinen einen niedrigeren Brechungsindex haben, als menschliche.

In allen Fällen, in denen man das Mischungsverhältnis der Oele nicht kennt, empfiehlt es sich, die Präparate zunächst in Wintergrünöl zu übertragen und dann, wenn dieses eingedrungen ist (nach Stunden bis Tagen), etwas Benzylbenzoat hinzufügen und damit fortzufahren, bis die maximale Durchsichtigkeit erreicht ist.

Zur Färbung der Kalksalze für das Studium der Verknöcherung etc. benutze ich eine sauere Alizarinlösung. Da zu stelle ich mir eine gesättigte Lösung von Alizarinum crystallisatum (Dr. G. Grübler, Leipzig), in 90% Alkohol her, versetze diese mit Eisessig bis zum Farbumschlag, füge noch einige Tropfen bis zum deutlichen Geruch nach Essigsäure bei und verdünne diese Lösing mit dem 20-50 fachen von 99% Alkohol. In diese. ganz leicht gelb gefärbte Lösung kommen de Präparate aus 99% Alkohol, und in ihr bleiben sie Tage bis mehrere Wochen. Dann wird der Ueberschuss von Farbe in 99% ausgewaschen.

Das Verfahren ist also für injizierte und zu entkalkende Präparate folgendes:—

1. Fixieren in Formalin 10%.
2. Wässern.
3. Entkalken (wie gewöhnlich).
4. Wässern.
5. Bleichen in Wasserstoffsuperoxyd.
6. Auswaschen.
7. Entwässern bis Alkohol absolutus (dieser einmal gewechselt).
8. Benzol (zweimal gewechselt).
9. Gemisch von Wintergrünöl und Benzylbenzoat.
10. Auspumpen des Benzols und der Luft unter der Luftpumpe.

Für Präparate mit Knochenfärbung gilt folgende Reihe von Prozeduren:

1. Fixieren in Formalin 10% (neutralisiert mit Ammoniak).
2. Bleichen mit Wasserstoffsuperoxyd (neutralisiert mit Ammoniak).
3. Wässern.
4. Entwässern bis 99% Alkohol.
5. Färben in saurer Alizarinlösung.
6. Auswaschen in 99% Alkohol (zweimal gewechselt).
7. Vollständiges Entwässern in Alkohol absolutus.
8. Benzol (zweimal gewechselt).
9. Weiter wie oben.

Weitere Einzelheiten s.: W. Spalteholz. Ueber das Durchsichtigmachen von menschlichen und tierischen Präparaten. 2 Auflage. Leipzig, S. Hirzel, 1914.

A FEW EFFECTIVE METHODS OF PREPARING AND MOUNTING SPECIMENS FOR EXHIBITION PURPOSES.*

By Chas. F. Silvester,

Department of Zoology, University of Princeton, N. J.

The problems which present themselves in connection with the proper display of delicate museum preparations and specimens are many.

While the method used by the writer has stood the test of time and the preparations have received more or less rough handling, it is not presented as a final word on the subject or with any misapprehension in regard to its defects or advantages. It is, however, presented with the hope that during the course of this discussion other and better methods will be brought out.

This note deals only with the display of specimens which are too delicate to hold their own weight when taken out of fluid and which are not tough enough to be sewed or tied to glass plates or rods.

The method consists in fastening the objects under consideration to wax plates by means of glass pins or staples.

First, a jar is selected which will fit the specimen or object to be mounted. The jar is coated on the inside with glycerine in order to prevent the paraffin or wax from sticking to the glass.

Second, waste paraffin or wax is melted and colored according to the background desired. Lamp Black and Zinc White have been found to be permanent for black and white backgrounds. If colored backgrounds are desired best quality oil tube colors have been used. The melted paraffin is poured into the jar to the desired thickness in order to make a good solid back upon which the object is to be fastened. The jar is placed on its back with a pane of glass over the opening and the wax is allowed to cool. Pieces of glass rod may be dropped into the mass before it is allowed to cool in order to give strength and rigidity.

Third, after the wax has cooled it is removed from the jar, trimmed and smoothed, and is then ready to have the object fastened on. Thin and light preparations, such as brain sections or delicate membranes, are floated into position on the wax plate and pinned fast with fine glass pins. The pins are made by drawing out hard glass rods to the desired thickness. The pins are driven well into the wax and are cut off with cutting pliers or bone forceps even with the surface of the specimen. The plate containing the preparation is placed in the jar so that the heads of the pins rest against the glass of the front of the jar and is then wedged in this position with glass rods or anything which will fill up the space between the back of the jar and the wax plate. If the object to be mounted is heavy the wax should be hollowed out to fit the specimen and glass staples may be used to hold it in place. This is all done under fluid of course. The back with the specimen attached is then slid into the jar and wedged into position as described above.

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* Read at the meeting of the International Association of Medical Museums, London, 1913.

In many instances the wax may be hollowed out to fit the specimen exactly. The plate is then wedged tight against the front of the jar and the preparation is held in position without the use of pins.

The various modifications of this method to meet the requirements of the different classes of delicate preparations will at once be suggested. The method has proved most useful for the display of preparations and specimens which are too delicate to hold their own weight out of fluid. It does away with the many disadvantages of mounting in glycerine jelly.

THE USE OF LARGE SECTIONS MOUNTED AS LANTERN SLIDES, AS AN AID IN MUSEUM TEACHING.*

By Carl Vernon Weller, A.B., M.D.,
Instructor in Pathology, University of Michigan.

The gap between the microscopical slide and the gross specimen is one which the average medical student has much difficulty in bridging. This difficulty is largely due to two factors: the small size of the microscopic field and the difference in the types of illumination in the two cases.

Even with the lower powers of magnification than those ordinarily used, the microscopic field still remains so small that the student has great difficulty in recognizing the grosser relationships. In fact, the entire section cut from such blocks as are

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* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, Mo., April 1st, 1915.

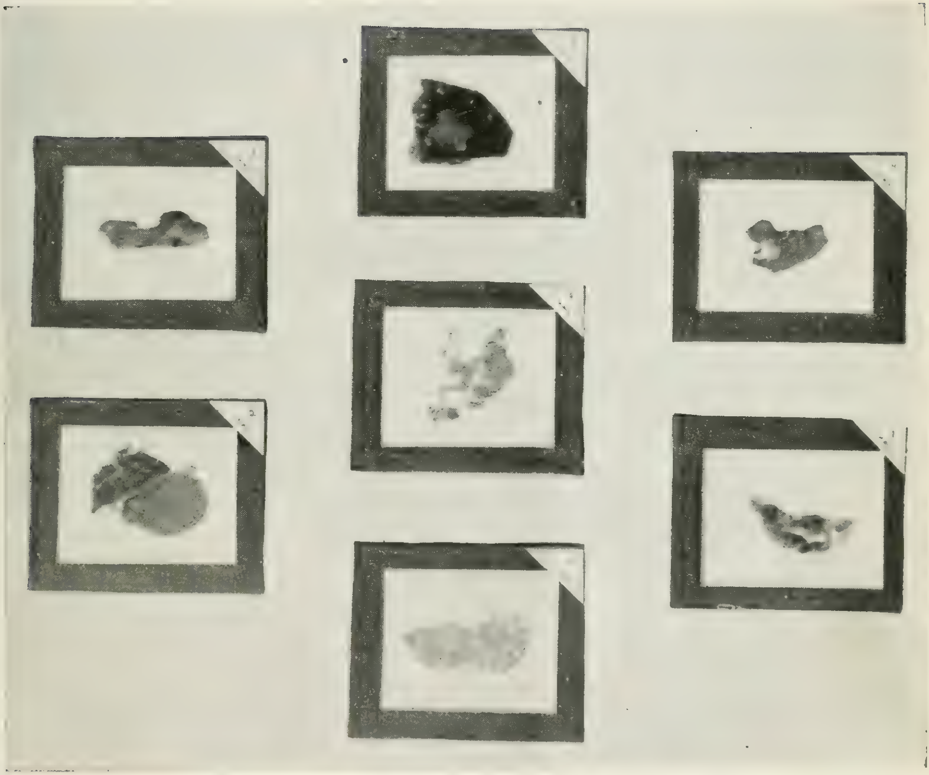

FIG. 1.—LARGE TISSUE SECTIONS MOUNTED AS LANTERN SLIDES

found to be of convenient size for routine diagnostic and teaching work oftentimes provides too small an area to assist greatly in interpreting the gross specimen in terms of the microscopical picture. The difficulty is increased by the fact that the impressions produced by transmitted and by reflected light are often not easily reconciled.

In the case of pathologic lesions which possess moderately gross structural characteristics, we have found that these difficulties may be in some degree overcome by the use of stained sections :—

1. Large enough to preserve the structural relationships which it is desired to emphasize, and

2. Thin enough to be viewed by the naked eye as semi-transparencies or to be identified with the lower powers of the microscope.

We have found it desirable to mount these large sections in such a manner that they may be projected directly as lantern slides. In this form they may also be conveniently passed from hand to hand, or may be displayed in the museum, either as opaque or as semi-transparent object, in connection with the gross specimen from which they are derived.

Concerning the technical methods employed very little need be said, for the cutting and staining of sections, such as we are doing, in itself offers nothing new or unusual. All of our sections have been cut from paraffin infiltrated tissues with a range of thickness of from ten to forty microns. If the preparations are intended chiefly for museum display it is better not to cut sections thinner than twenty or twenty-five microns. Either direct fixation upon the slide with egg albumin, or molasses fixation with transfer to a celloidin sheet, may be used with equal success. If many sections are to be prepared at one time, molasses or dextrin fixation is much to be preferred.

The staining may be of whatever nature the specimen demands. We have used haemalum and eosin routinely In the interest of economy, we have mounted our sections upon old lantern slides from which the emulsion has been removed by boiling. The xylol used in the final cleaning is carefully blotted away and clear balsam, rendered more fluid by warming, is applied. The cover glasses are those everywhere used for covering lantern slides. These are warmed before applying and the excess balsam is then carefully pressed out. This may be done easily in a turntable clamp such as is used in taping lantern slides. Before putting on

the binding strips it is well to let the preparation harden for several days. The advantage in this is that it makes it possible to correct any retraction of the balsam from the edges of the glass plates. With a hard balsam, however, very little difficulty will be found with the formation of air spaces through retraction of the balsam. This difficulty means that too thin a balsam is being used.

This method is especially useful when the pathologic lesions have rather gross relationships. It accordingly finds ready application in demonstrating the extent and character of the extensions of malignant processes, large tuberculous foci, gummata, cystic change, large areas of infarction, haemorrhage, hypoplasia, and hyperplasia of organs, and many other gross lesions.

EINE NEUE METHODE ZUR KONSERVIERUNG DES HERZENS.*

Von D. Wolhard,

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Das Herz wird nach Präparation der grossen Gefässe uneröffnet aus dem Thorax genommen und möglichst von Blut und Fasergerinnseln befreit, mit Wasser ausgespült. Dann werden in folgende 4 Gefässe Glasröhren von ca 50cm Länge eingebunden:

1. In die Vena cava superior.
2. In die dieser zunächst liegenden Pulmonalvene.
3. In die Aorta.
4. In die Arteria pulmonalis.

Alle uebrigen Gefässe, Vena azygos, die 3 uebrigen Venae pulmonalis, die Vena cava inferior werden durch Einbinden von Korkstopfen oder durch Zuschnüren fest verschlossen, und nun das Herz in einem Glas verdünnten Spiritus an den Glasröhren aufgehängt, durch die alle Herzhöhlen mit demselben Spiritus gefüllt werden. Die weitere Behandlung ist die eines mikroskopischen Präparates.

Nach einigen Tagen wird der Spiritus gewechselt und das Herz in steigenden Concentrationen gehärtet. Wenn die Härtung

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* Read at the meeting of the International Association of Medical Museums, London, August, 1913.

vollständig ist, werden die Glasröhren entfernt, das Herz wird in ein geschlossenes Glasgefäss mit absolutem Alkohol gebracht, dann in Xylol und schliesslich in einen Thermostaten bei ca 60° Grad in geschmolzenes Paraffin. Wenn aus diesem nicht verschlossenen Paraffin-gefäss das Xylol abgedampft ist, lässt man das Herz in dem Thermostaten auf einen Sieb abtropfen, um das ueberschüssige Paraffin zu entfernen. An dem erkalteten Präparat wird dann in jede Herzhöhle mit einem scharfen Messer ein Fenster geschnitten.

ON THE APPLICATION OF WOLHARD'S METHOD FOR THE PRESERVATION OF THE HEART.

By J. C. Meakins, M.D.,
Royal Victoria Hospital, Montreal.

The heart is removed from the body inside the pericardium. The vena cava is cut as long as possible, as are also the pulmonary arteries and veins, and the aorta. Great care must be taken not to perforate the ventricles or the auricles. After the heart is removed it is washed thoroughly in tap water in order that the clot may be removed from all the cavities. A glass canula is then tied into the superior vena cava, while a suitable sized cork is tied into the inferior vena cava, care being taken not to injure the valve of Vieussens. The pulmonary veins are then carefully tied off as far from the auricle as possible, and in one a small glass canula is fixed. Rubber tubes are attached to the two canulae and the cavities still further irrigated. The heart muscle may be washed by increasing the water pressure in the tube leading to the right auricle and clamping the pulmonary artery. In this way a certain degree of reverse circulation is established through the coronary sinus. This may be still further accomplished by tying a large canula into the aorta and washing through the coronary arteries. Corks are then introduced into the pulmonary artery and the aorta several inches from their origin. The cavities of the heart are then drained free of the water and are filled with methylated spirits. An irrigating can is connected to the rubber tubing attached to the canulae and raised several inches above the heart so as to keep the chambers distended with slight pressure. The heart is left in methylated spirits for two days or longer, depending upon its size. It is then transferred to fresh 95%, or if a series is being put through, absolute alcohol may be used repeatedly. After 24 hours it is removed and the canulae are separated, the corks removed from the various orifices, and the superfluous structures about the base of the heart are dissected away. The aortic and pulmonary valves are placed in their diastolic position and kept so with pledgets of cotton wool. The heart is then placed in absolute alcohol where it remains for several days; when it is transferred to first xylol and after 12 hours to second xylol. If dehydration is not complete (the heart should be a uniform mahogany colour) it must be replaced in absolute alcohol and the xylol stages repeated. If it is completely dehydrated it is immersed in soft paraffin for 12 hours and then into hard paraffin with a melting point of 56 to 60°C., where it remains for 24 hours. At the end of this period it is removed and suspended by a thread passed through the apex and placed in a paraffin oven to drain for some hours. It is then removed and hung in a cool place.

(Note.—The length of time that the heart remains in the various solutions will depend altogether upon its size.)

INDIA-INK INJECTION OF BURSAL SPACES OF HEART, SHOWING DISTRIBUTION OF AURICULO-VENTRICULAR BUNDLE.*

By J. Kaufmann,
McGill University, Montreal.

Injection of subendocardial bursal spaces to demonstrate the distribution of the bundle of His, method suggested by MacCallum and described by Cohn.[1]

The method consists in laying open the left ventricle in such a manner that the moderator band is intact. On the surface of the band one observes an opaque longitudinal band. This is one of the best spaces to start the injection from. We use an ordinary glass syringe with a fine needle and use the ordinary Higgins India-Ink.

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* Presented at the meeting of the International Association of Medical Museums, April 9th, 1914.

[1] Cohn,—"Demonstration of Ox-Hearts showing Injection of the Conduction System." Proc. of the New York Path. Soc., 1911, XI, 130-132.

Cohn,—"The Post-Mortem examination of Horses' Hearts from cases of Auricular Fibrillation." Heart, Vol. IV, 1912-13, p. 221.

The needle is inserted into the bursal space and on injecting the ink we find that it flows with the greatest ease in all directions. At times we need several injecting points. The injected spaces take on a greenish hue and they outline more or less completely the entire network of subendocardial bursal spaces in which are embedded the auriculo-ventricular neuro-muscular fibres.

Keep the heart submersed in water while injecting. Preserve in 2% Formalin.

THE STAINING OF PATHOLOGICAL SPECIMENS IN THE GROSS.*

By Oskar Klotz,

From the Pathological Laboratories, University of Pittsburgh, Pittsburgh, Pa.

At the meeting of the German Pathological Association in 1913, Benda reported upon the staining of gross specimens with sudan. Concurrently with his experiments we were carrying out similar methods, applying them to a greater variety of tissues than reported on by him, and applying other combinations of stains to demonstrate more clearly the characters of tissues in gross specimens.

The staining of tissues containing fats and lipoids by sudan, scharlach-roth, or alkanin has found excellent application for student demonstration. This is particularly true where small quantities of fat are frequently not properly appreciated by the student unfamiliar with the disease process and the varying picture so frequently induced in different stages of the same process. Moreover, preparations preserved by the ordinary methods of museums (Kaiserling or formalin) do not bring out the presence of fatty deposits but on the contrary, with age lose the natural differentiation of fat from the surrounding tissue. Benda as well as Jores found a favorable application of the sudan method in the staining of the arteries by sudan. This, as is shown in our demonstration gives excellent results and shows the presence of fat in minute quantities in lesions both superficial and deep. The intimal streaks of the aorta appear with unusual brilliance. Atheromatous plaques with the overlying endarteritis differ in the intensity of the color according to the mass of endarterial thickening. The results are not so striking in the advanced atheroma with ulceration, as in them, the fatty change is diffuse over all surfaces of the vessel as well as in the isolated atheromatous plaques.

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* Read at the meeting of the International Association of Medical Museums, April 9th, 1914.

The differentiation of fatty infiltration and fatty degeneration of the heart is also well shown, and I know of no better method of preserving demonstration specimens of these lesions.

Another striking application of the sudan staining is obtained in cancer of the breast, where the surrounding fat tissue takes the deep orange stain while the cancerous area remains unstained or a pale pink. Not uncommonly such specimens demonstrate the development of metastases in the surrounding stroma which, in the unstained specimen, are difficult to recognize. The cancerous masses stand out in such contrast that, for the teaching of gross pathological specimens, it is of great aid.

Again, in fatty changes of the liver, be these diffuse or lobulated, the sudan staining brings out the changes in the tissues very clearly. Fatty changes associated with portal cirrhosis may be counterstained with haematoxylin subsequent to the sudan treatment. Tuberculous processes are also well demonstrated by this method.

The method consists in fixing the tissues in formalin until thoroughly hardened. They are then trimmed ready for mounting and rapidly washed in 60 per cent alcohol. The specimens are then placed in a saturated solution of sudan in 70 per cent alcohol and allowed to remain for three days to a week in this solution. When removed they are washed in water for several hours and then allowed to remain in a jar of 5 per cent formalin until the excess adherent sudan is removed. The specimens are permanently mounted in a 5 per cent formalin solution. The specimens counterstained with haematoxylin are treated for about 20 minutes in Boehmer's alum haematoxylin subsequent to the sudan treatment. These specimens are then blued to the desired color in an alkaline water.

Another useful and rapid staining method for gross specimens is obtained by the use of a two per cent aqueous solution of acid fuchsin. By this means the connective tissue stroma can be readily demonstrated, and even the fine trabeculae illustrated in a manner not obtained by the ordinary methods of preservation. The specimens remain in contact with the stain for 15 to 60 minutes, are rapidly washed in water and then allowed to remain in 95 per cent alcohol for several hours. Such specimens are not permanent, and are used soon after preparation for class demonstration. If placed in absolute alcohol, the color can be preserved for weeks. This method has found useful application for demonstrating fibrosis of breast, lung and liver.

A NEW METHOD OF PREPARING MUSEUM SPECIMENS TO SHOW DIFFERENTIATION OF TISSUES.*

By R. H. Malone, M.D., and L. Heddick,
From the Pathological Laboratory, Royal Victoria Hospital, Montreal.

A routine use of the Kaiserling process for specimens which reach a laboratory of surgical pathology is contra-indicated by the facts, that few of them are useful either for teaching or for permanent mounting, and that such procedure would be needlessly expensive. Many tissues that could be advantageously preserved are found to have been spoilt by the long stay in formalin that is inevitable. Even were this not so, the most favourable conditions would fail to preserve certain definite lesions satisfactorily, as the glycerine or Kaiserling process is ineffective for many specimens of disease of the breast, for instance.

It occurred to us that there will be a distinct advantage in employing a fat stain as a means of improving differentiation in old specimens, and experiments showed that however old or bleached a tissue had become after lying in formalin on our shelves, it could be so treated that its structure would stand out wth vivid clearness. The pancreas, breast, heart and arteries have been found to afford very suitable material for our purpose, the range of organs showing that the process can be applied to autopsy as well as to operative material.

Methods.

Stage 1:—Slabs of pancreas or breast are cut 1 to 2 cm. in thickness and immersed in 10% formalin for 2 or more days until the tissues are fixed, hardened and partially bleached.

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* Read at the meeting of the International Association of Medical Museums, April 9th, 1914.

Stage 2:—The excess of formalin is now washed out in running water for 5 to 10 minutes, and the tissues are transferred to a [1]saturated solution of Scharlach R. in 70% alcohol. The following precautions must be observed.

(1) The specimen must be exposed to the staining fluid on all sides, and should rest on a layer of cotton wool, not on the bottom of the containing jar.

(2) The jar should be kept tightly covered to prevent evaporation of the alcohol.

(3) Specimens should be trimmed and made ready for mounting before staining with Scharlach R., and large quantities of staining fluid should be used, as the penetrative powers of the fat stain are very weak, only the surface of the tissue taking on the red colour to any extent.

(4) The organ must be examined from time to time and removed when the fat has stained bright red. Prolongation of the staining period beyond this point results in a diffuse colouration of the tissues (not fat).

About two hours' staining in a freshly made solution should prove sufficient for most organs but no definite rule as to the time of staining can be laid down.

Stage 3:—The specimen is then washed in running water for 5 or 10 minutes and transferred to a saturated aqueous solution of bichloride of mercury. In a few minutes the fat will assume a more brilliant red colour while the other structures will become whiter. In the case of pancreas and breast, sufficient differentiation will be obtained in ½ to 1 hour. The bichloride will be seen to produce 3 effects:—(1) Bleaching; (2) Improved differentiation; (3) Added brilliance to the red colour of the fat.

The organ is now ready to be mounted in 5% formalin.

With arteries, it is advisable to bleach for a much longer period. It is interesting to note the variety of colours assumed by fatty streaks in the aorta, some stain orange, some pale red, and others a brilliant red, due perhaps to differences in the chemical constitution of the fat or variations in the amount of fatty acids present.

Heart muscle stained by this method becomes brown and contrasts well with the subepicardial fat (red) and with the epicardium and endocardium (dusky white). The characteristic "thrush breast" or "tabby cat" structure of fatty hearts is exceedingly well-shown by cutting across the papillary muscles and stripping off the mural endocardium before fixation in formalin, as this allows the Scharlach R to come into intimate contact with the heart muscle itself. On removing the heart from the staining fluid the subepicardial fat will be well-stained while the myocardium fails to reveal the characteristic markings; but a few minutes immersion in the saturated bichloride solution will be sufficient to bring out clearly any fatty changes. Maximum bleaching may be expected in the course of a couple of hours.

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[1] About 10 grms. per litre of alcohol. Leave in incubator for 24 hours, shaking from time to time. Filter before using.

Counter-staining with alum haematoxylin was found helpful in differentiating normal breast tissue from tumour growth. The specimen is stained with Scharlach R. as described above and then counter-stained in haematoxylin for 1 minute, washed in running water and transferred to lithium carbonate (saturated solution) until the tumour is pale blue. If over-staining had occured, decolourize in 5% hydrochloric acid, wash thoroughly to get rid of traces of the acid and transfer again to lithium carbonate until proper differentiation is obtained.

Specimens of pancreas showed good differentiation by this method, but the contrast was not as striking as when Scharlach R. and bichloride of mercury alone were used.

As far as our experience goes, the method gives permanent results.

RAPID COLOR METHOD FOR DIFFERENTIATION OF FAT IN GROSS SPECIMENS.*

By J. Kaufmann and E. L. Judah.

The organ to be stained is appropriately cut into thin slices preferably not more than half an inch in thickness. The thinner the slice the more rapid the staining the better the bleaching and the more pretty the final result.

(1) Immerse the section to be stained in an alcoholic solution of Sudan Red and depending on its thickness leave it in the dye for anywhere between 15 minutes to ½ an hour. The end result in the dye is a diffuse deep red staining of all the tissues, being most marked of course in the fatty tissue.

(2) Now remove from the Sudan Red and wash well in running cold water.

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*Read at the meeting of the International Association of Medical Museums, Toronto, April 9th, 1914.

(3) Immerse specimen in ordinary commercial methylated spirits and wash carefully. A few minutes usually suffice to remove the stain from the surrounding non-fatty tissue. The specimen has to be carefully watched all the time it is bleaching in the methylated spirits the same as a Kaiserling specimen in alcohol. A final washing in absolute alcohol for about a minute further emphasizes the differentiation of the stained fat from the other tissues.

(4) Wash carefully in cold water and mount in 2% formalin.

ON THE DEMONSTRATION OF MICRO-CHEMICAL REACTIONS IN MUSEUM SPECIMENS.*

A. S. Warthin.

Pathological Laboratory, University of Michigan.

Great aid may be given to the teacher in general pathology and particularly to museum demonstration through gross preparations showing various micro-chemical reactions. It is possible with some care and ingenuity to make preparations that will show to the naked eye the more important micro-chemical reactions such as amyloid, calcification, fatty infiltration, fatty degeneration, mucin, connective tissue hyalin, fibrosis, and the various pigmentations. Among the most striking of all are the beautiful preparations that can be secured with the aid of the newer fat dyes, Sudan III, Scharlach R., etc. The number of recent papers concerning the demonstration of fatty changes in gross preparations by means of these dyes shows the coincidence of discovery in widely scattered laboratories of the value of such preparations. My first preparations with the fat dyes were made as early as 1903 with aortas stained with Sudan III and Scharlach R. to show the fatty changes in the intima. Before that time, however, I had made beautiful preparations showing the Berlin blue reaction in organs in a state of haemosiderosis. The beauty and the permanency of these preparations led me from time to time to attempt other demonstrations of specimens showing various micro-chemical reactions. Many of these have been failures, while others have aided greatly in the efficiency of teaching work. My best results, however, have been obtained in the demonstration of iron pigment and in the use of the various fat dyes. I give here a very brief survey of the possibilities in this line, a field as yet but slightly worked.

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* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, 1915.

1. *Haemosiderosis.*—Beautiful preparations of pernicious anaemia liver, spleen, lymph nodes and bone marrow, malarial liver and spleen, all the organs from cases of general haemochromatosis, organs from cases of acute haemolytic poisoning such as potassium chlorate, infections with bacillus pyocyaneus and haemolytic streptococci, organizing haematomata, old extravasations, organizing thrombi, etc., may be made by fixing the tissues first in alcohol or formol, then treating not too thick slices for some hours in a saturated solution of potassium ferro-cyanide, then for several hours in a 1% solution of hydrochloric acid until the blue is well developed, thorough washing in water, and preservation in 4% formol. Any teacher having access to a large autopsy material can ultimately acquire a beautiful series of cases illustrating all the varieties and phases of iron pigmentation.

Ammonium sulphide and hydrogen sulphide preparations can also be made, but the black color is not as striking to the eye in gross preparations and is not permanent. I have several Berlin blue preparations over ten years old and as bright as when they were first made. Haemosiderosis of the haemolymph nodes in Banti's disease and in pernicious anaemia can be well shown by this method. Many of these preparations of lymph nodes I have converted into gelatin preparations; but the blue color shows somewhat better in the wet specimens.

2. Preparations of organs and tissues containing fat stained with Sudan III or Scharlach R. may be produced as most striking aids in teaching. Among the many preparations possible are aortas showing atheroma and fatty degeneration, fatty degeneration and fatty infiltration of the heart, liver, and kidneys, lipomatosis of the pancreas, kidney, parotid, sub-maxillary gland and striped muscles, elephantiasis lipomatosa, sections of breast tumors and cysts, sections of small lipomata, etc. Material should be fixed first in formol; formol washed out after a few days; put into alcohol for a few hours or shorter time, especially if small; then stained in bulk in alcoholic or acetone solutions of Sudan III or Scharlach R. for one to several days; then wash thoroughly in water, differentiate in alcohol, and preserve in 4% formol. Fatty degeneration and infiltrations can be beautifully differentiated in this way, also the types of fat. Cholesterol esters,

and other lipoids give a different color, more brown, than that obtained with the glycerin esters. The studies of the changes in the blood vessels obtained by these preparations are also most striking and instructive.

Very good osmic acid preparations can also be produced, particularly of the fatty infiltrations.

3. Von Kossa's method can be applied to the gross demonstration of lime salts.

4. Weak solutions of acid fuchsin can be used to demonstrate connective tissue hyalin and fibrosis. Counter-staining with haematoxylin may be used to bring out the contrast. The most beautiful results, however, are obtained by applying the Van Gieson method to tissues showing connective tissue hyalin, such as the ovary, hyaline myofibromata, cylindromata, laparotomy scars, contracted kidney, healed tubercles, hyaline goitres, etc. The material should first be stained in bulk in Weigert's iron haematoxylin, then in the Van Gieson mixture of concentrated water solution of picric acid and acid fuchsin until the rose-red color of the hyalin stands out sharply. Very instructive pictures can be made of sections of the entire ovary, the stain bringing out most beautifully the corpora fibrosa and corpora lutea. The picric acid, however, is lost in fluid permanent preparations, but is preserved for a longer time in jelly. Beautiful preparations of colloid and hyaline goitres may be made by this same method. It is better, however, to preserve these in balsam.

5. My experience with amyloid has not been very successful, none of my preparations lasting more than two years when exposed under ordinary conditions to the light. My best results were obtained with the Birch-Hirschfeld method, using a 20% gentian violet solution and contrasting with Bismarck brown. Slabs of amyloid liver, spleen and kidney preserved in syrup will make good preparations for two years. Other metachromatic reactions and the iodine reaction last but a very short time. In the case of the iodine reaction the mahogany brown color may be preserved longer by keeping the material in iodine vapor.

These are but hints and suggestions of the possibilities of this hitherto unworked field in the teaching of pathology and museum demonstration. It is one of the side paths that may be taken up by the progressive teacher in his effort to drive home lasting impressions of important pathological conditions.

A MODIFIED JORES' METHOD FOR THE PRESERVATION OF COLORS IN GROSS SPECIMENS.*

By Oskar Klotz and W. W. G. MacLachlan.
(From the Pathological Laboratories, University of Pittsburgh)
Pittsburgh, Pa.

The Jores' method for the preparation of museum specimens aims at the preservation of the colors in anatomical and pathological tissues. In general the aim is similar to that of the Kaiserling method, but it possesses certain qualities which make it preferable to it. The Jores' method is easier of application, cheaper in preparation and brings out color reactions seldom obtained by other methods. In our hands, it has been much simpler to apply to all types of tissues and does not need the close attention for changing the specimens to the succeeding solution. Moreover, the specimens never diminish in the brilliancy of the colors during any stage of the process, and we have not been troubled in having to deal with specimens which have been overdone in the first solution, as is frequently encountered with the Kaiserling method.

In the Kaiserling method, there are three stages in the preparation which must be appreciated,—fixation of the tissues, restoration of the color, and preservation. In the Jores' method, there are only two stages, since the color is never lost from the first, and requires no restoration. The alcohol treatment of the specimens (Kaiserling No. II) falls away entirely. Moreover, with the small percentage of formalin in the fixing solution, the specimens remain pliable and do not tend to shrink irregularly. In order to obtain the best results all specimens must be thoroughly washed in normal saline solution before being placed in the Jores'. This procedure is merely to clean the surface of the tissue, and do away with adherent debris.

The fixing solution recommended by Jores was as follows:

Karlsbad salts	5
Chloral hydrate	5
Formalin	5
Water	100

In following this prescription we have met with some failures which were in part accounted for by the commercial Karlsbad salts used. We have, therefore, made up a modified Karlsbad salt of the following composition:

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*Read at the meeting of the International Association of Medical Museums, Toronto, April 9th, 1914.

Soda Sulphate	22
Soda bicarbonate	20
Soda chloride	18
Pot. nitrate	38
Pot. sulphate	2

Furthermore, we have found that in using a considerably weaker solution, and increasing the time of fixation from 2 to 10 days, the results were more striking. At present, we use the following combination, which improves considerably after standing for a few days.

Modified Karlsbad salts	125
Chloral hydrate	125
Formalin	125
Water	4000

On account of the weaker formalin solution, the penetration of large organs is more rapid, and we do not have the leathery covering produced, which was so commonly found in the Kaiserling preparations.

The colors in the depths of organs are preserved equally well as on the surface. This is often of advantage in trimming specimens after fixation.

When thoroughly fixed the specimens are washed in cold running water for 6 to 10 hours. This is important, as it is advantageous to remove all the salts and formalin before placing the specimen into the preserving fluid. Jores advises the use of the Kaiserling III fluid for final preservation. We have, however, preferred Frost's fluid, leaving out, however, the sodium fluoride from the solution.

Cane sugar	3500
Pot acetate	160
Chloral hydrate	80
Thymol water	8000

THE ADVANTAGES OF JORES' FLUID, AS MODIFIED BY KLOTZ, FOR TEACHING DEMONSTRATIONS.*

By J. H. Hewitt.

Our Teaching Demonstrations consist in collecting a large number of preserved organs, as livers, lungs, hearts, etc., giving an organ to each member of a group of students and having the student, after a few minutes study, give to the assembled group an oral description of the organ and any pathological changes he may have observed. The Demonstration is open to extensive amplification and variation. For example, we may have clinicians assemble for us clinical cases and demonstrate the clinical signs, when there is a characteristic clinical picture associated with the morbid condition under consideration; a freezing microtome may be brought in, microscopic sections of the lesions prepared on the spot, stained, studied, and a microscopic description added to that of the gross specimen. The occasion may thus be made one of great activity, both for the demonstrators and for the individual students; every one may share in the work and get something out of it.

I am personally indebted to Dr. Klotz of the University of Pittsburg for the formula for his modification of Jores' fluid which I have now been using for about a year as a preserving fluid for organs and tissues.

Our method has been to select from the material removed at each necropsy such organs as seemed suitable for Teaching Demonstrations. The selected material was then strung, like fish, on a strong fishing cord. On the cord was also placed a red fibre-board tag with the necropsy number written with a heavy lead pencil on both sides. The organs were then washed in normal salt solution, freshly prepared, by dipping them three or four times into a large vessel of this solution. They were next wrapped in cotton so that no contiguous surfaces were in direct contact and placed in a barrel half filled with the modified Carlsbad salt, chloral hydrate, formalin, and water. The organs were not further disturbed until they were desired for a Demonstration. At this time the organs desired were removed from the strings on which they were strung and an individual fibre-board tag with the necropsy number was placed on each organ, for future identification. After the Demonstration the organs were returned to the same fluid and allowed to remain till they were again wanted. The fluid was only replenished from time to time to make up for loss by evaporation or in order to cover thoroughly the accumulated organs.

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* From the Pathological Laboratory of the Cleveland City Hospital and the Western Reserve Medical School, Cleveland, Ohio.

We have found that with organs and tissues preserved within eighteen hours after death by this method the natural color and appearance is better preserved than after the use of Kaiserling's fluid or any modification of it with which we have worked. The organs may be used repeatedly for demonstrations and may be readily and minutely examined. Simply washing the specimens a few minutes under the water tap or soaking them a short time in water removes the last disagreeable trace of formalin and does not injure the specimen. Thus the absolute loss of color produced by alcohol, the ever annoying "veil of tears" of formalin, and the nasty stickiness of the potassium acetate and glycerine of Kaiserling's fluid is entirely obviated. Moreover the color is accurately preserved and microscopic sections of the organs and tissues demonstrate good fixation and sections serviceable for study. In a word, the fluid possesses more advantages for this kind of work than any other preserving fluid that we have thus far had experience with. We believe we make no error in recommending it to anyone who may desire a serviceable general single fluid, at small cost, for preserving organs and tissues in their natural colors.

We have found that care must be taken to secure the tissues and organs within eighteen hours after death or their removal, otherwise hemolysis takes place, the fluid takes up the pigment and stains all of the other organs a dirty pinkish-red color, thus destroying the natural color the fluid may have originally preserved in them.

ON THE PRESERVATION OF WAR MATERIAL FOR MUSEUM PURPOSES.*

By J. G. Adami, M.D., F.R.S. and E. L. Judah.

It may not be generally known that the British War Office has arisen to the medical occasion during this, the greatest of world wars. For years past the British Army Medical Service has been growing in efficiency, until those of us who have followed developments are not surprised to learn that the Field and General Hospitals in the theatre of war and along the lines of communication have excited the admiration of all other nations by their equipment and superb administration. But this is not all; the income of the National Research Committee established by the Government under the recent National Insurance Act is something over $250,000, and with the war this money has been almost entirely devoted to medical research in association with the war. Three months ago, this Committee had dispatched fifty bacteriologists and other researchers for special investigation in the hospitals in France and Egypt, and was prepared to support fifty more trained observers if they presented themselves. Further the War Office has determined to compile a medical history of the war adequate for the occasion. The model for that, as for all medical histories of campaigns must be the great Medical History of the Rebellion; and the very knowledge that such a History is to be prepared makes it essential that material from important cases be preserved for illustration and study in the quiet years following the rush and hurly-burly of the war.

For material for microscopic investigation the means of preservation cannot be greatly different from those employed in the ordinary laboratory. The best fixatives will have to be employed on the spot. At most for transport to the home laboratory each worker will probably arrange some means whereby in place of a multitude of small bottles, jars capable of holding a large number of pieces of duly hardened tissue will be employed, each piece being wrapped separately with its number affixed.

It is the larger material suitable for museum purposes with which we are more concerned. As you will know the Army Medical Service of the United States saw the importance of such material; in fact the material collected during that war made, and still makes, the excellent Museum of the department in Washington. At a relatively early period in that campaign, the Director General sent out instructions to each Army Hospital, pointing out the value of such materials and the methods to be employed for the preservation and transport of such material. Bones and joint specimens were to be prepared in a dry state whenever possible. Moist specimens were to be collected in large barrels, each specimen tagged with a wooden tag, wrapped separately in a cloth the barrel being filled with diluted alcohol or whiskey. A duplicate list of the contents was to be forwarded along with the barrel to the Surgeon General's Office, the full description being afforded of each specimen.

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* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, Mo., April 1st, 1915.

[1] History of the War of the Rebellion, Vol. I, p. vii.

The problem before us is how to transport the maximum amount of material in the most perfect condition in the smallest space, and this in a container least liable to damage. Further all specimens if they are to be transported *en masse*, must be fixed and prepared by the same method; and this must be a method whereby the colours are preserved. Further the fixation method must not require the use of large amounts of fluid media, like glycerine, which might be difficult to supply to the different hospitals during the campaign.

In our experience—and here we base ourselves upon the observations of one of us at McGill—the preservatives that most nearly fulfill all these requirements, are those recommended by Klotz and Maclachlan in their modification of the Jores method. Professor Klotz described the method to this Association last year. The formula of his fluid No. 1 is, as follows:

Modified Karlsbad salts	125 parts
Chloral hydrate	125 parts
Formalin	125 parts
Water	4000 parts

This combination improves in condition after standing for a few days. The commercial Karlsbad salts recommended by Jores were found to give irregular results. Klotz and Maclachlan therefore made up an artificial Karlsbad salt with the following composition:

Soda sulphate	22 grs.
Soda bicarbonate	20 grs.
Soda chloride	18 grs.
Pot. nitrate	38 grs.
Pot. sulphate	2 grs.

Using this solution infiltration of large organs is fairly rapid, and colours in the depth of the organs are preserved as well as on the surface. Organs may be left in this fluid from two to ten days or longer; are then washed in cold running water for from six to ten hours; all the salts and formalin should be removed before placing the specimen in the preservation fluid.

This method has the following advantages:

(1) All the ingredients, with the exception of formalin, can be taken along with the hospital stores in a dry state, as salts, and so are easily transported, and formalin is easily procurable.

(2) Their cost is relatively slight; we know no method of preserving the colours of museum specimens that is of so low a cost.

(3) Passage through two fluids only, is necessary.

(4) The length of time in which the specimens remain in fluid No. 1 is not a matter of care; tissues do not deteriorate by long keeping in No. 1; in fact specimens might be shipped from Europe to America in No. 1, and only after weeks placed in No. 2, and still after washing well with water, when placed in No. 2 the natural colours show themselves.

(5) The method is universal, applicable to all tissues.

Tanks for preparing the specimens may easily be found by taking a wine cask, three feet or more in length, and sawing it in two, and making wooden covers to cover over the top of each half. A layer of sacking or cotton cloth may be fastened on the under surface of the covers, to make them more air tight. There must be no nails coming through the cask; in fact metal must not be allowed to come into contact with the fluids at any stage of the preparation.

Similar barrels can be employed for transportation; loosen the upper hoops at one end, remove the end; divide the interior into compartments by means of slats somewhat as in an egg crate, giving each specimen a compartment to itself, and in this way build up the contents from the bottom. Wrap each specimen in wet absorbent cotton; by no means use dry cotton wool for such is almost impossible to remove from the specimen later; cheese cloth or other tissue is inadvisable as it marks and spoils the specimen. When the barrel is full replace the end, and the metal hoops, drive them home tight, and fill with fluid 2 through the bung.

Klotz recommends Frost's fluid as preferable to Kaiserling. He modifies it by leaving out sodium fluoride, so that the formula is:

Cane sugar	3500 pts.
Pot. acetate	160 pts.
Chloral hydrate	80 pts.
Thymol water	8000 pts.

Bone specimens, we recommend, should be prepared dry. After removing all superfluous flesh, soak in a saturated solution of white arsenic (Arsenic trioxide) for from ten to fifteen minutes, then dry in the air. The specimen may now be wrapped in paper or cheese cloth, and packed in a strong box for shipment.

Each specimen should be tagged and given a number, and at the time of shipment, there should be forwarded a list giving the numbers upon the tags together with a full description of the lesions exhibited by each specimen, the official number of the case from which the specimen was obtained, and the name of the medical officer who secured the specimen. The tags must not be of metal or of paper; in our experience the most satisfactory tag is that recommended by Professor W. G. MacCallum. By means of a Bates automatic numbering machine, consecutive numbers are stamped upon a length of tape one inch wide, which is then paraffined and rolled up; the numbers are cut off and attached to specimens in succession.

AN EFFICIENT AND INEXPENSIVE PERMANENT MOUNTING FLUID FOR GROSS SPECIMENS.*

By Samuel R. Haythorn, M.D.
Allegheny General Hospital, Pittsburg, Pa.

Every laboratory recognizes the importance of preserving and mounting in their natural colors, as many interesting gross specimens as possible. This sometimes becomes a problem on account of the expense of preparing the necessary fluids, and of procuring the proper sort of glassware. It seems therefore, that anything tending to reduce the cost is worthy of consideration.

The permanent solutions recommended by Kaiserling and Pick have served to fill most of the requirements so far as efficiency is concerned, but both of these fluids contain relatively large amounts of glycerin which is a very expensive constituent. Frost[1] recommended a formula which by substituting cane sugar for glycerin offered a good permanent solution at a greatly reduced cost. My experience with this solution has been in general quite satisfactory but there have been instances where the glass containers have become slightly cloudy. This is doubtless due to the use of sodium fluoride. One entire batch which we made underwent fermentation and almost completely decolorized the specimens which it had been used to preserve. Doctor Klotz, in whose laboratory at the University of Pittsburg, Frost's solution has had a very thorough trial has mentioned to me that he has had a similar experience.

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* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, Mo., April 1st, 1915.

The possibility of using arsenious acid in place of sodium fluoride was suggested by Delépine's article on "Arsenious Jelly"[2] and with that end in mind I carried out a series of tests. Specimens were selected and fixed in Jores' solution as modified by Klotz and Machlachan,[3] thoroughly washed and divided as nearly as possible into equally proportioned pieces. Several combinations of arsenious acid with Frost's solution and modifications of that solution were prepared and the pieces of tissue distributed among them. The containers were sealed and placed upon the laboratory shelves without any precautions for protection against light, or temperature changes and were examined from time to time. Two solutions soon proved themselves to be far superior to the others. One of these was the original Frost's and the other was one of the modifications, the formula for which is:

Arsenious acid	40 G.
Potassium acetate	160 G.
Cane Sugar	3500 G.
Water q. s. a. d.	8000 C. C.

To make up the fluid, the acetate and sugar are dissolved in just enough water to take them up, the arsenious acid is dissolved in the remaining amount of water with the aid of heat, and the two solutions are then combined.

This fluid has appeared to us to preserve the lighter shades of red equally as well as the original method of Frost, and to bring out the darker red tones in even better contrast. It also has the advantage of being less expensive as it can be prepared at about one half the cost of Frost's solution and for a little more than one fourth as much as Kaiserling III. We have therefore adopted it for general use.

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[1] R. Frost (Proc. Path. Soc. Great Britain and Ireland, Jan., 1912).

[2] Journal of Pathology and Bacteriology, January, 1914, page 345.

[3] Klotz-Maclachlan, see Article in this Bulletin.

The method which we now use in the Allegheny General Hospital laboratory for preserving gross specimens is as follows:

Pieces or slices of organs are chosen in preference to whole organs. These are rinsed off in a roughly prepared salt solution and placed in the Klotz-Maclachlan modification of Jores first solution for from one to three weeks, depending on their size. They are then washed over night in running water and immersed in our permanent solution. After a day or two they are examined and if the solution is not discolored, it is replaced by fresh fluid and the permanent mounts made. If discoloration has occured, it shows that the fixation has not been thorough enough and the specimens are returned to the first solution for a time. After this they are again washed and placed in the preserving fluid.

We recommend the fluid on the ground that it can be prepared very cheaply and has given us better satisfaction than any of the other mounting fluids which we have tried.

Sodium Fluoride	80 G.
Chloral Hydrate	80 G.
Potassium Acetate	160 G.
Cane Sugar	3500 G.
Saturated Thymol Water	8000 C. C.

COLOR PRESERVATION IN GROSS SPECIMENS BY FORMALIN CHLORAL-HYDRATE METHOD.*

By Sidney J. S. Peirce, M.D., Winnipeg.

I wish to present two specimens consisting of the two kidneys obtained at the same autopsy, the one fixed and preserved by the usual Kaiserling Method, and the other fixed in 10% formalin and without further treatment beyond a superficial washing in water, placed and permanently mounted in a 10% solution of chloral hydrate in distilled water. The date of the preparation is July 3, 1911, and beyond renewing the labels they have not been touched since. They have stood on the laboratory shelves without special protection from light or changes in temperature. It will be seen that the solution of the Kaiserling preparation is a little discolored whereas the chloral hydrate is perfectly clear. The colors of the latter preparation, however, are hardly as brilliant as those of the Kaiserling preparation. Nevertheless, I think it will be acknowledged that the color preservation compares not at all unfavorably with that of the more elaborate and more costly method. Two specimens of inflamed appendices prepared by the Formalin-Chloral-Hydrate method are also shown. These bear the date of Dec. 26, 1912.

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*Read at the meeting of the International Association of Medical Museums, Toronto, April 9th, 1914.

ON THE ARSENIOUS ACID-GLYCERIN-GELATIN ("ARSENIOUS JELLY") METHOD OF PRESERVING AND MOUNTING PATHOLOGICAL SPECIMENS WITH THEIR NATURAL COLOURS, AND ON THE USE OF NEW FORMS OF RECEPTACLES FOR KEEPING MUSEUM SPECIMENS.[1]

By Sheridan Delépine.

Public Health Department, University of Manchester.

(Illustrated by a Collection of Tuberculous Guinea Pigs and other Pathological Specimens, and 50 Photographic Enlargements of Preparations Mounted by this Method.)*

ABSTRACT.[2]

The preservation of pathological specimens with their natural colours or something approximating it and allowing of a distinction being made between various tissues in the several conditions in which they can be found in health or disease is a matter of importance not only from an educational point of view, but also in connection with the keeping of accurate scientific records.

Experiments with various fixing and mounting solutions were begun in conjunction with Prof. Hamilton of Edinburgh Univer-

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[1] Presented at the meeting of the International Association of Medical Museums, London, August, 1913.

[2] For the full Article the Reader is referred to the Journal of Pathology and Bacteriology, Cambridge, Vol. XVIII, No. 3, January, 1914, in which this paper is published.

sity, in 1882. Good results were obtained with bichromate of potash and biniodide of mercury, and with formaldehyde after its introduction in 1893. The simplest and most effective method was found to be fixation in solution of 4% to 8% formalin with sufficient sodium sulphate added to bring the mixture to a Sp. gr. of 1024 to 1028, and transferring of the solution to Arsenious Acid in Glycerin, in which the specimen may be preserved and mounted, or may be preserved by the "Arsenious-Acid-Glycerin-Jelly" and mounted between or on glass plates.

The method I now generally adopt is as follows:

A.—FIXING SOLUTION.

Formol (commercial) 40 per cent solution..	100 c.c.
Water	900 c.c.

To which may be added—

Sulphate of Soda	20 grms.

The specimens are left in this solution for from three days to two weeks, according to thickness. A piece of tissue half an inch thick is sufficiently fixed and hardened in two days.

(For a time I used a larger proportion of formaldehyde, 5% and even 8%, but I found that for most purposes a 4% solution was sufficient).

B.—ALCOHOL (80 to 90 per cent).

The specimens are left in this fluid until the colour has returned as nearly as possible to its original tint. A few hours are generally sufficient to obtain a satisfactory and permanent superficial effect.

C.—ARSENIOUS ACID GLYCERIN FLUID.

Arsenious acid solution (made by boiling an excess of arsenious acid in water for two hours, and allowing the fluid to stand for twelve hours	400 c.c.
Pure glycerin	600 c.c.

The specimens are transferred from the alcohol to this solution, where they must be kept for one or two days at least. They may without serious disadvantage remain in it for two or three weeks, if the solution does not cause marked shrinking.

D.—ARSENIOUS ACID GLYCERIN JELLY.

Formula for about 8 litres.

1. Coignet's gelatin (Gold label).......... 425 grms.
   Arsenious acid, saturated watery solution (see C) ....1500 c.c.
   The dry gelatin, thoroughly cleansed, is added to the hot arsenious acid solution, in which it should be entirely dissolved in less than half an hour.
2. Hot arsenious acid jelly (see [1])...........1925 c.c.
   [1](say 2000)
   Pure glycerin (hot) ....5760 c.c.
   (say 5800)

The two are mixed together and allowed to cool to about 20° C, then the whites of six eggs and their broken shells are added and mixed thoroughly with the mass. The mixture is brought again to nearly boiling-point to coagulate the albumin, and is maintained at this temperature for two hours.

The hot fluid is strained through flannel and then filtered through filter paper, the temperature of the fluid being kept at about 50° C. This takes from one to three days.

This medium is absolutely transparent, and when set does not melt at the highest summer temperature.

MOUNTING OF SPECIMENS ON GLASS PLATES.

The specimen is mounted against the glass plate through which it is to be seen, and is embedded in jelly which is covered at the back with a glass plate smaller than the front plate. The back plate is also used to apply a backing of suitable colour, generally white, grey or black. Nothing is done to close the sides which are protected by resting the front plate upon the rim of a box made of plaster of paris, glass or metal.

The little glycerin which oozes out of the medium is absorbed by some porous paper, plaster of Paris or felt which is placed between the back plate and the bottom of the box, this padding also supports the back plate. Under these conditions the back plate follows the gelatin when it shrinks and air does not penetrate under the glass.

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[1] Out of a series of mixtures the one containing exactly the amounts given in the formula gave the best results as regards transparency, stability, and resistance to heat, but the round figures indicated in the parentheses are sufficiently near for practical purposes.

Specimens of almost any size can be prepared by this method. (The longest mounted up to the present is 2 feet 8 inches in length).

This method of mounting in Arsenious-Acid-Glycerin-Jelly on glass plates is much more economical than that of Kaiserling, owing to the cost of glycerin and of large museum jars, and it has also the merit of stability, many specimens having stood 17 years without contraction of the glycerin or change in colour.

To facilitate manipulations, and reduce the amount of time needed to mount specimens by this method, I have devised certain appliances which I will describe.

Levelling table.—A large glass table (with levelling screws) with tall legs to allow of the inspection of the specimen from below whilst it is being mounted.

Heavy steel bars[2] of suitable shape and thickness to form the sides of a mould for the gelatin medium.

The inner side and one end of each of these bars are polished, and cut at such an angle that they come in perfect apposition with the ends of other bars; the gelatin sets rapidly on coming in contact with the cold metal.

Moulds for making plaster of Paris boxes, which need not be described.

Aluminium dishes and boxes.—In order to save the time required for the preparation of plaster of Paris dishes I had various kinds of earthenware and glass dishes made, but these were heavy, clumsy and expensive. Finally, I adopted a form of aluminium dish which has answered the purpose very well. The first type has a flat flange to which the top glass plate is fixed by suitable binding. To simplify still further the work of mounting, I have had boxes made to the lid of which the front glass is fixed, the box is closed like an ordinary box. Whether plaster of Paris or metal cases are used, the gelatin must not come in contact with the sides of the dishes. The tools necessary to make these boxes have proved fairly expensive, but the boxes themselves can be obtained at a comparatively small cost, from Messrs. W. M. Still & Co., Ltd., Charles Street, Hatton Garden, London.

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[2] The table, steel bars, and levers are made by Mr. Charles W. Cook, University Works, Bridge Street, Manchester.

EXPERIENCE IN THE USE OF GELATIN IN MOUNTING ANATOMICAL PREPARATIONS.*

By R. J. Terry,

Washington University Medical School, Saint Louis.

Experiments with gelatin as a mounting medium were made in 1898 in connection with the preparation of sections of the cadaver by a method involving decalcification and cutting with a knife.[1] Our object was to preserve the sections in a way permitting their free handling by students in the class room. The method employed was as follows: The section was washed for several days in running water in order to remove the acid used in the decalcification, was then placed in a shallow zinc tray and covered with hot gelatin to which a little formalin was added. A glass cover was applied so as to meet the surface of the gelatin and to rest in a shoulder of the free edge of the tray. Finally, a strip of adhesive tape sealed the joint between the cover and the tray. Such preparations lasted about one year, the gelatin eventually liquifying. Modifications of this principle were tried with varying results as to durability. More durable mounts were obtained when rectangular glass jars were substituted for the trays. But the results were far from satisfactory and other methods departing from the original one were tried. One of these, applicable to all sorts of wet preparations, has been used as a routine method since 1907 and because specimens prepared in that year are apparently intact, I venture to report our experience and recommend the process as a simple and useful one for mounting anatomical preparations.[2]

The routine process involves the use of gelatin for two different purposes, viz., for fixing and protecting delicate parts of the specimen; for supporting the preparation in the museum jar. While these ends are ordinarily attained by one technical process a consideration of them separately will prove advantageous.

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* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, 1915.

[1] "A Method of Sectioning the Whole Decalcified Body with a Knife," R. J. Terry, Proc. Assoc. Amer. Anat., 13th Session, May, 1900.

[2] The Technical process here described was presented under the title "The Preservation and Mounting of Wet Preparations for Museums" before the St. Louis Academy of Science in 1911, by Dr. Charles A. Todd, who has had extensive experience with it. The paper was not published.

Gelàtin as a fixative.—It frequently happens that, after a specimen has been prepared and mounted in a jar, an amount of detritus, small or large, is given off from cut surfaces and open vessels, muscles, etc., clouding the preserving fluid, and forming a deposit upon the bottom of the container. This disintegration can be prevented by covering the specimen with a thin layer of gelatin. Since we have found that such coating cannot be seen when the object is mounted wet and is not otherwise objectionable it has become our custom to cover with gelatin all preparations intended for preservation in formalin solutions. The gelatin coat also serves as a reliable fixative for water colors applied to vessels, muscles, etc. The color of the crico-thyroid muscle shown in Fig. 1 has been retained for a period of seven years. It should be understood, however, that in regard to artificial coloring, gelatin fixative only prevents washing out and does not seem to have any effect in inhibiting the destruction of some colors which takes place in formalin solutions. The most important function of gelatin as a fixative was found in the support and rigidity to delicate parts, the position and relations of which are often so difficult to adjust and maintain in a wet preparation. Small vessels, nerves and thin membranes may be fixed in their natural places by the application of gelatin, thus obviating the necessity of using pins, threads and other visible mechanical means which detract from the interest of the specimen. Parts of preparations treated in this way have retained their original relations for years. A further application of this principle has been made in the case of hollow organs. Figure 2 represents the caecum, colon and the termination of the ileum, the walls of which were distended by filling the cavities with a mass of gelatin which is sufficiently transparent to permit the conformation of the mucosa being seen through the opening made in the side. Stomach, gall-bladder, duodenum and other hollow viscera have been distended by injection of gelatin, thus insuring the preservation of their forms after mounting in sealed jars.

Gelatin as a support.—The placing of a specimen in a museum jar in which it is to remain for exhibition, often calls for considerable thought and ingenuity. The success following laborious preparation of an object can be vitiated by thoughtless or unskillful mounting. Two faults are commonly observed: instability of the mount, unsightly means of supporting the specimen. For several reasons the object should always be fixed and should never be left so that its position is subject to change, and

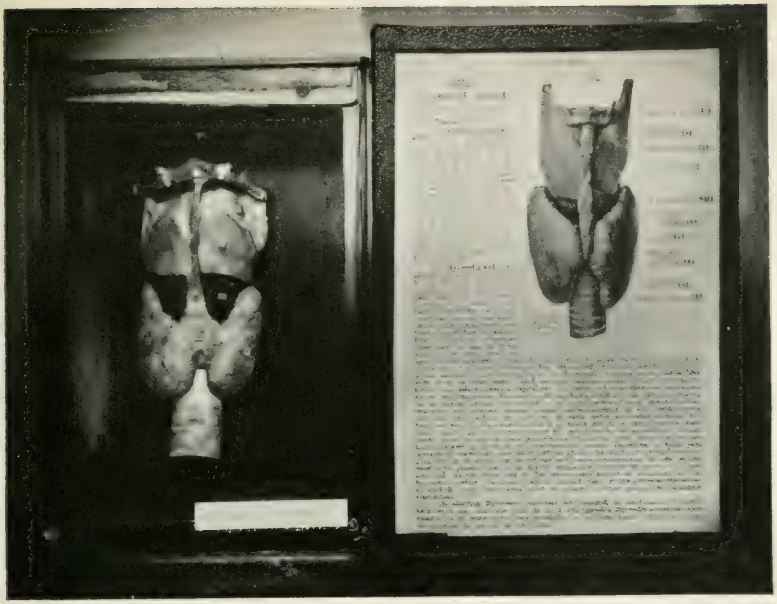

FIG. 1

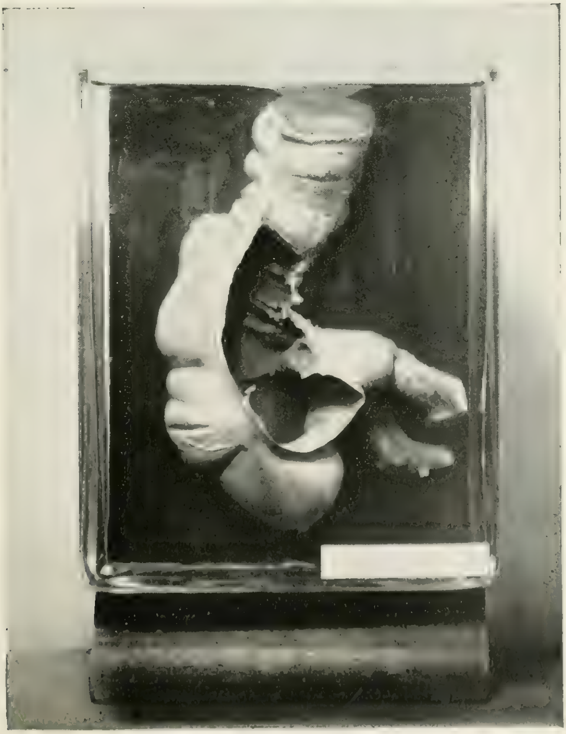

FIG. 2

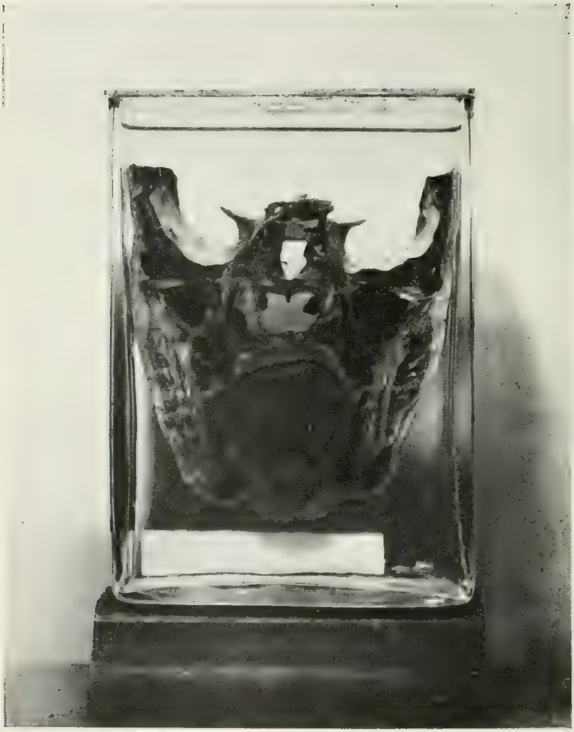

Fig. 3

every effort should be made to fix and support the preparation in its place with the minimum of mechanical agents. We have found that most wet specimens can be supported by the simple provision of a background plate. Where only one view is desired, the background can be prepared from a sheet of slate cut to fit the jar. Upon this the object is fastened by gelatin, or if large, by cords sewn through the back of the specimen and passed through holes bored in the slate. Gelatin is sufficiently strong to support on a background specimens as large as the brain or the liver. Membranes, walls of hollow viscera and sections (Fig. 3) are most advantageously mounted by fixing them by means of gelatin to a glass plate in the jar or even to the wall of the jar itself. In the latter instance the better view is obtained from the side of the jar opposite to that on which the membrane is spread. Paper labels bearing names or reference numbers are fastened to parts by means of the gelatin coating which, as stated above, we apply to all wet specimens (Fig. 2).

The technique of gelatin, as we employ it, presents few difficulties. We have used a white commercial gelatin made up in plates.[3] It is prepared in the usual way, but for supporting specimens on backgrounds the mass is made somewhat thicker than that used for the fixative. Our museum specimens are prepared from material fixed in formalin. Application of the gelatin for the several purposes described can be made generally at one time. Attention is given first to the support of the specimen. The background plate is laid on a table and some thick gelatin poured upon it; in this the specimen carefully oriented is set. The fixative can be applied now by means of a large camel's hair brush. Sometimes it is more expedient to apply the fixative by dipping the object in thin gelatin, draining, and then placing it on the background. Delicate parts are retained in their natural positions by means of small pins until the gelatin covering them has begun to set. At this stage the mount can be moved without risk, and should be placed in its jar, the latter *resting on its side* so that the background and specimen are still in a horizontal plane. A little formalin solution is now poured into the jar which at the same time is elevated slightly at the end presenting the opening. The cover is laid against the jar's mouth and the preparation left for several hours until the gelatin has been hardened by the formalin vapor. If now it is desired to label the specimen, it can be removed with its background from the jar and the labels fastened by gelatin applied with a camel's hair brush. If the labeling is an extensive piece of work requiring a long time, the parts of the specimen not in the field of operation should be kept covered with cloths moistened in weak formalin. Finally the preparation is returned to its jar, and immersed in a 5% solution of formalin.

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[3] This gelatin is designated in trade by the name "Silver Label, technical," and is made at Fort Wayne.

Marked discoloration of the gelatin has occurred in some instances and was a serious enough defect in one or two cases to necessitate its removal and the reapplication of new gelatin. Usually any discoloration that has happened has not proved objectionable since the layer covering the specimen is so thin as to be perfectly transparent. Discoloration occurred most frequently with specimens which previous to mounting had been preserved in carbolic acid. Two points should be emphasized in conclusion, viz., first that the original plan contemplating the mounting of specimens in a gelatin mass has been for the time abandoned and a method which employs gelatin as a fixative in the form of a thin coat over the specimen and as a means of supporting objects, substituted in its place; second, that this method, so far as we have used it, involves the preservation of specimens in formalin solutions.

DELÉPINE'S ARSENIC GLYCERIN JELLY METHOD OF PRESERVING GROSS SPECIMENS.*

By C. E. Royce, M.D., Iowa City, Iowa.

Delépine's method of preserving gross specimens in arsenic glycerine jelly has first to recommend it the advantage of all gelatin preparations, that is, compactness and stability and further possesses as its distinct advantage permanence of natural colors under the most abusive light conditions. This quality was observed by Delépine for eighteen years before he published his method.

I shall present concisely the method of Delépine and elaborate afterward upon the difficulties encountered and the means used in overcoming them.

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* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, Mo., April 1st, 1915.

FIXATION:

After much experience with chrome salt fixations used in parallel with formaldehyde the following formula was adopted as being the most satisfactory.

FORMULA A. FIXING SOLUTION.

Formalin	100 cc.
Water	900 cc.
Sodium Sulphate	20 gms.

The purpose of the sodium sulphate is to prevent the extreme hardening action of the formalin. The proportion named maintains the tissue in a consistency readily cut into the thin slices desirable.

RESTORATION OF COLOR:

FORMULA B. FOR RESTORING THE NATURAL COLOR.

This formula is the usual 80-90% alcohol.

CLEARING:

FORMULA C. FOR CLEARING AND PREPARING THE TISSUE FOR IMBEDDING.

Distilled water	1000 cc.

Add white arsenic in excess of solubility.
Boil for two hours. Allow to cool and filter.

Take 400 cc. of the cooled and filtered solution and add to it 600 cc. of pure glycerine. This combination is known as Arsenic Glycerine Fluid.

In practice the tissue to be mounted is trimmed to the desired shape and a portion or portions of the desired area and not over 4 cm. in thickness covered with the fixing solution. Four days of this treatment will fix sufficiently.

Very thin slices of the desired area should then be made (and by thin we should understand something not over 5 mm.). These are placed in fresh alcohol (Formula B) and carefully watched as the color returns, removing at the desired color stage and placing them in the Arsenic Glycerine Fluid. Here they must remain three to four days and the same number of weeks will do no harm unless they appear to be shrinking.

IMBEDDING:

FORMULA D. ARSENIC GLYCERIN JELLY.

Part 1.

Coignet's gelatin (Gold Label)............425 grams
Saturated watery solution of arsenic, (as made
in Formula C before the glycerine is added) 1500 cc.

Heat the saturated watery solution of arsenic nearly to the boiling point and add the gelatin. It should be dissolved in half an hour.

Part 2.

The hot arsenious acid jelly just completed totals 1925 cc. To this add hot glycerine, 5760 cc. Mix well and allow to cool to 20°C. Then add the whites and the broken shells of half a dozen eggs and mix thoroughly with the mass.

Again heat nearly to the boiling point and maintain at this temperature for two hours. Then strain the hot fluid through flannel. Finally filter through paper maintaining the temperature at 50°C. during the filtration.

Receive and store the filtered product in pint glass jars with a rubber washer to make them air tight. Keep until desired in a cool dark place.

In the course of following out this method, there have appeared various points of difficulty some of which I have solved by consulting other writings on the subject, notably those of Dr. Hewitt,[2] whose paper was read before this society in 1912, and Dr. Casey Wood's[3] comprehensive study on mounting gross preparations of the eye.

The preparation of Formulae A, B, C, offers no special difficulties.

Formula D, however, is more complex in its management.

You will notice that the highest temperature required is just below the boiling point. From 85°C. to 87°C. is sufficient. It is very important that the temperature shall not be allowed to go above the figure mentioned as any excess of heat gives the final product a brown discoloration. In the final filtration the maximum temperature is set at 50°C. Here again it is important not to allow the temperature to go higher, as a higher temperature than 50 C. for any length of time has a tendency to tinge the jelly with brown. You will notice that the instructions of Delépine say to lower the temperature to 20°C. before mixing in the eggs. Here is perhaps a typographical error, for the gelatin mass solidifies at 30°C. About 40°C. should be the temperature when the eggs are added.

I have found it highly essential to use a perfectly clean porcelain enameled dish, the inner coating of which is intact. A double boiler of this sort such as is used for kitchen purposes is ideal. The egg shells must be white. None of the yolk may be added. The flannel for straining must be pure white. If this is unobtainable use several layers of absorbent cotton between gauze. You will see the object is to keep out of the process anything having color.

Both Dr. Delépine and Dr. Hewitt have mounted the preparations between two glass plates.

Delépine's apparatus for doing this is no doubt very efficient but cumbersome and of special manufacture. Dr. Hewitt's tin trays in which the whole preparation is immersed in gelatin are good but I have substituted trays of clear glass. These give an advantage in that one may hold the preparation over a mirror when driving out bubbles from beneath the specimen and be sure that all are removed. Still better, I think is a glass bottomed tray in which the glass through which the specimen is to be seen forms the bottom. The sides are formed by strips of hard wood one-half inch by one inch, fastened to the glass by adhesive plaster. In a tray of this sort, the melted gelatin may be poured and the specimen adjusted, the whole resting on a hot plate during the process. When the bubbles have been removed from the under surface of the specimen, lower a cover glass cut smaller than the first to just cover the top of the gelatin. Lower carefully with enough gelatin to avoid bubbles. Hold in place by pegs driven through a bit of board. In twelve hours the gelatin will have set and the glass may be removed leaving the gelatin preparation between two glass plates. Add a backing of any paper desired to the back glass and on top of this two or three sheets of absorbent paper. Now add the third glass of the same size as the first or front glass. The gelatin does not approach the edge of either front or back glass within one-half inch. The front and back glass may be united with a passe partout or adhesive plaster. The intermediate glass that coincides with the edge of the gelatin is free to follow the gelatin when it contracts and prevents air from entering between glass and gelatin.

The use of a glass bottomed tray is of advantage in getting out the bubbles. The hot plate on which to adjust the mount drives out bubbles and kills any proteolytic ferments that might still be active and later cloud the gelatin. Dr. Delépine has em phasized especially the necessity of allowing the back plate freedom of motion so that it may follow the gelatin when it contracts.

The waste plates of the X-Ray department are usually accessible and very serviceable for the glass supply.

REFERENCES.

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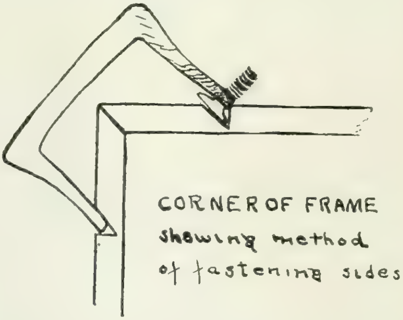
2. The International Association of Medical Museums, Bulletin No. IV, August 1, 1913, Ann Arbor, Mich., U. S. A., and Montreal, Canada.

3. The Various Methods of Preserving and Mounting Gross Eye Preparations. J. Am. Med. Assoc., XLI, No. 13, 1903.

THE USE OF PLASTER OF PARIS IN MOUNTING GELATIN PREPARATIONS.*

By C. E. Royce, M.D., Iowa City, Iowa.

Delépine mentions the use of plaster of paris in his description of the Arsenious Acid Glycerine Jelly Method but without detail. His aluminum boxes are of special manufacture to be used in connection with his imbedding apparatus.



The ease with which plaster of Paris can be made to surround a gelatin preparation between glass plates early recommended it to me as worth a careful trial. For applying the plaster, I constructed frames like that shown in the diagram. The clamps are such as are used on lace drying frames.

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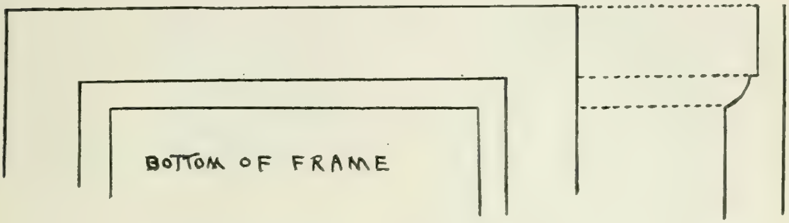
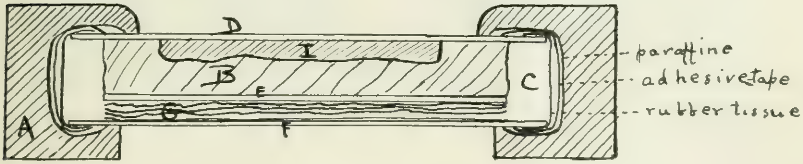
* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, Mo., April 1st, 1915.

After the gelatin has set and the excess scraped away, the glass surfaces should be cleaned first with warm water followed by alcohol and ether, equal parts.



Tear a strip of adhesive plaster three times as wide as the space between the glass plates and long enough to go completely around the edge of the plate and 2 cm. to spare. Cut a strip of rubber tissue the same length and twice as wide as the space between the plates of glass. Stick this lengthwise to the adhesive side of the adhesive plaster leaving an equal margin on each side.



CROSS SECTION OF SPECIMEN MOUNTED IN GELATIN AND FRAMED WITH PLASTER OF PARIS - A- plaster of paris; B-gelatin; C-air space D-front glass; E-middle glass; F-back glass; G- above, background; middle, absorbent paper. below, data concerning case; I- specimem

Then apply the combination of rubber tissue and adhesive plaster to the mount after the manner of passe partout. Now with a brush cover the whole of the exposed plaster with several coats of melted paraffin. Cover also a small margin of glass inside the line of adhesive plaster.

A background of paper is applied of any color or texture desired. Cut it to fit close to the glass and cover with a third glass plate, which by heating its edges easily makes a tight joint with the paraffin. If it is desired to expose data regarding the specimen place the sheet of paper containing the same so that the printing shows through the third glass.

The preparation is now placed in the frame with the specimen side down. If a description has been placed in the back lay over it a piece of board of the size opening necessary to show the whole printed area. Pour in plaster of Paris cream until the frame is full. In half an hour loosen the frame and remove, first taking out the board placed in the back.

It may be argued that plaster breaks easily but the breaking of the plaster of Paris frame requires very little effort of restoration compared with that entailed by breaking a museum jar. In fact where specimens are passed about from hand to hand, I think the plaster of Paris by reason of its thickness offers better protection against breakage of the gelatin preparation than any of the other frames I have seen proposed.

ON THE USE OF AGAR-AGAR FOR MOUNTING SPECIMENS BETWEEN GLASS PLATES.*

By J. H. Hewitt, M.D.,
From the Pathological Laboratory, Cleveland City Hospital, Cleveland, Ohio.

I[1] have described a method for mounting thin tissues and slices of organs in Kaiserling-gelatin between plates of glass held apart by metal frames. My results with this method have been for the most part altogether disappointing. It appears that by heating the specimens to 80 degrees centigrade for a few minutes a certain number of them may remain permanent, but the majority of them eventually liquify or become filled with cracks and ragged fissures. On discussing these failures with Dr. Rogers Perkins of the Department of Bacteriology and Hygiene of the Western Reserve Medical School, he suggested that agar-agar filtered by a process that has been described and which they had used with great success for clarifying culture media, might be used in place of gelatin, as they had been able to render agar practically as clear as gelatin.

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* Read at the meeting of the International Association of Medical Museums, Toronto, April 9th, 1914.

[1] Hewitt: Bulletin No. IV. The International Association of Medical Museums.

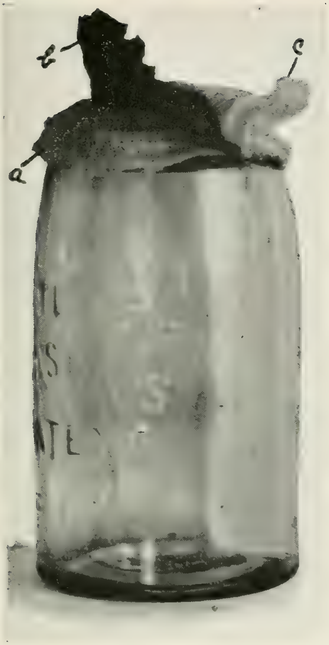

Fig. 1

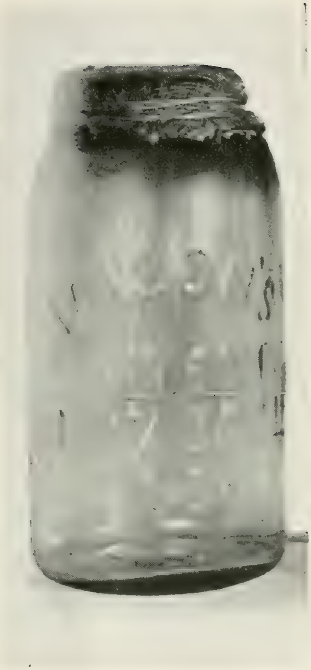

Fig. 2

Fig. 1.—A Mason's Jar with (*a*) Two Layers of Surgical Gauze, (*b*) Three Layers of Filter Paper, and (*c*) Two Layers of Surgical Gauze over its Top, ready to be Moistened and Tightly Bound with Cord.

Fig. 2.—A Mason's Jar with the Gauze and Filter Paper Covering Its Mouth Securely Fastened by Several Wrappings of Cord. The Vessel is Ready to be Inverted and Placed in the Boiler Containing the Medium to be Filtered. A Small Glass Rod Worked in the Meshes of the Top Layer of Gauze and Projecting Over the Margin of the Mouth Prevents the Jar from Becoming Attached to the Boiler.

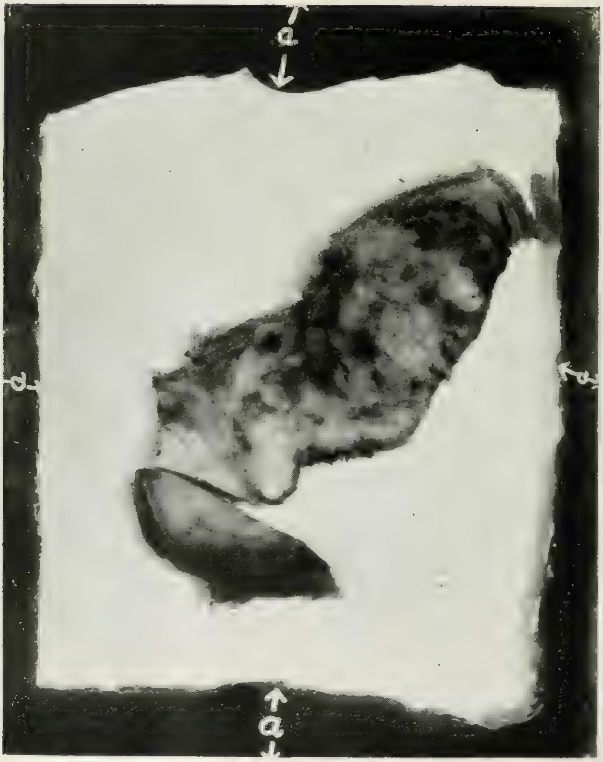

Fig. 3. The Appearance of the Mount After the Agar-Agar has been Removed and the Margin (*a*) Filled with Paraffin. The Margins are Further Sealed by Dipping the Edges Successively into Melted Paraffin, the Mounts Being Held Perpendicular During the Process.

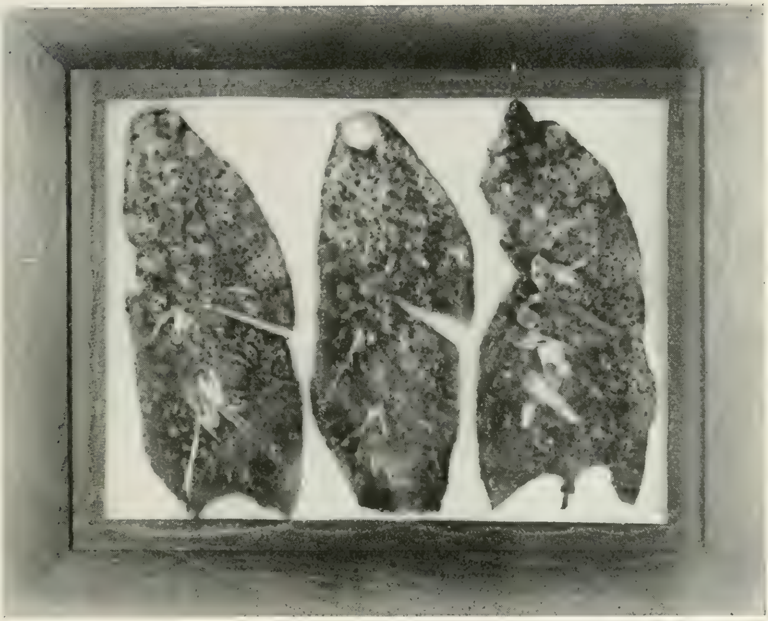

Fig. 4.—Slices of a Whole Tuberculous Lung Cut in a Meat Slicer, Mounted by the Above Method, Framed, and Hung on the Wall.

A few preliminary experiments were made and the results were so encouraging that I have recently been directing my attention particularly to agar-agar as a mounting medium.

It was soon observed that here, also, because of shrinkage, air spaces and cracks formed beneath the glass plates. To prevent this the metal frames were abandoned.

The method as I now employ it consists in:

1. Preparing and Filtering the Medium.
2. Mounting the Specimen.
3. Sealing and Ornamenting the mounted Specimen.

PREPARING AND FILTERING THE MEDIUM.

The medium consists of a 1.5% agar-agar in a 20% aqueous solution of glycerin. The agar is dissolved in the fluid over a water bath and then over the direct flame for five or ten minutes, stirring continuously until all the agar is in solution. It is then allowed to cool to about 40 degrees centigrade and one whole egg for each liter of medium is thoroughly beaten and mixed with the liquid. The amount is then made up to the original volume with distilled water. Clean jars or bottles are then prepared. Ordinary Mason fruit jars are admirably suitable for this work. The mouths of the bottles or jars are covered with two layers of Canton flannel or surgical gauze, (see Fig. 1). (The original method of filtering employed only several layers of Canton flannel, but I find that filter paper held in position with surgical gauze serves as well, if not better.) This covering is bent securely around the margin of the jar, moistened with water, bound with several wrappings of cord, and securely tied, (see Fig. 2). Jars of sufficient number that their combined capacities equal about twice the amount of medium to be filtered are prepared.

The jars thus prepared are all bound together and placed, bottoms up, into a large boiler containing the egg and medium mixture. A small glass rod is worked in the meshes of the top covering of gauze and allowed to protrude over the margin of the jar, so the jar can not become fixed to the bottom of the boiler. The boiler is covered with a lid extending over the margins, to prevent water of condensation falling inside. It is then placed in a steam sterilizer for one hour, or in an autoclave, at fifteen pounds pressure, for seven minutes. This coagulates the egg in the medium and clarifies the medium. As the heated jars cool the medium is drawn through the filter paper and a clear transparent product results. In thin layers, if used immediately, this medium is practically as clear as gelatin. With each subsequent heating the medium becomes darker and less transparent. The best results are secured by preparing and using the medium immediately after its first filtering.

MOUNTING THE SPECIMEN.

The specimen is mounted in the same manner as I have described for gelatin except that no permanent support for the top glass plate either of glass or metal is used. A glass plate of suitable size is placed in a tin pan which is about 3 centimeters longer and wider than the glass plate used. Sufficient hot agar to which a small amount of thymol has been added is then poured into the pan to cover the specimen. The specimen is then placed in position, bubbles pressed from its undersurface, and a top or cover glass placed directly over it. The edges of the glass plates are brought one above the other and the medium allowed to congeal. Specimens with irregular surfaces may be mounted by placing glass or metal supports at either end of the glass plate to support the cover glass while the medium is congealing. When the medium has congealed this support is removed and the specimen sealed as the others. When it is desired to fix a specimen in a definite position, or one wishes to be certain there are no bubbles beneath the specimen, a thin layer of agar is poured over the bottom plate. The specimen is set in position and the agar allowed to congeal. After the agar has congealed the glass plate can be removed and the undersurface of the specimen examined. It is then replaced in the mounting pan. Sufficient agar is then poured to cover the specimen and the cover plate is placed in position.

After the agar has congealed the mounted specimen is removed from the pan by cutting through the agar around the margins of the mount. The excess of agar is trimmed away from the edges and dug out from between the plates to the depth of one and one-half centimeters or more around all of the margins. The surfaces of the top and bottom plates are cleaned and wiped dry, as well as the space between the plates from which the agar has been removed. The specimen is then ready for sealing.

SEALING AND ORNAMENTING THE MOUNTED SPECIMEN.

The specimen mounted as described above is sealed with paraffin by placing it in a pan, about the size of the one used for mounting, and filling the pan till the top plate is covered to the depth of one to two millimeters with melted paraffin. The paraffin is allowed to cool until it is of a medium soft consistency. A cut is then made through the paraffin around the margin of the mount, a thin bladed knife or spatula is placed beneath the bottom plate and the mount is lifted from the pan. The paraffin is scraped from the surfaces of the top and bottom plate and the margins trimmed smooth (see Fig. 3). The glass surfaces are scrubbed clean with alcohol and the four edges are then successively dipped to a depth of a centimeter or more is melted paraffin. The latter process is repeated till the edges are surrounded with a thin layer of paraffin. This completely seals the mounts and the other coverings protect this from breaking. Surgical adhesive, cut in strips of the desired length and width and heated until the gummed surface is quite sticky and tenacious, is drawn tightly over the margin and stuck to the surfaces of the adjacent plates. Over this two coats of thick shellac are applied. When the shellac has dried a border of black leatherette paper is placed over the adhesive. Photographic paste is used for pasting this paper border. When it has dried it is painted over with shoe polish and the mount is complete.

Specimens mounted in this manner may be framed as pictures and hung on the wall (see Fig. 4). We have such a specimen, 11 x 14 inches, framed that has been hanging on the wall of our laboratory now four months without alteration or change. The larger the specimen the thicker the glass plates must be, as they tend to bend or bulge under the weight of the specimen and of the medium, and when such does occur cracks and fissures result.

My experience with the method has been too short to offer assurance of its ultimate usefulness, but certainly it appears to me more reliable as a general medium for permanent mounts than any combination of gelatin that has so far been devised.

Potassium Acetate is not added, as in the gelatin method, because the color of the specimens appear to be retained as well without it and there is less discoloration of the agar mixture.

CEMENT FOR SEALING RECTANGULAR MUSEUM JARS.*

By William Coburn,
University of Pittsburgh, Pittsburgh, Pa.

Every laboratory, that uses rectangular jars for the storage of wet tissue specimens, has experienced difficulty in obtaining a suitable cement for attaching the lids. There are many cements on the market, and there are as many more others prepared and used by individual laboratories. Each has its advantages and disadvantages.

In the main, the various cements depend for their usefulness upon the ability of entering the solid stage either by a process of evaporation of one of their constituents or by a change of their physical state in cooling. Obviously the cement substance must be such that it will not be dissolved by the fluid within the jar.

The rectangular jar, which, when properly prepared, so admirably exhibits the contained specimen, requires a cement of unusual tenacity to bind the cover to its narrow walls. Such a cement must have decided adhesive qualities and must not be too thin, or else the slight unevenness of the opposed surfaces will have "leaking" bubbles. Moreover, the cement must not be affected by alteration of the room temperature.

The following preparation has, in our hands, given good satisfaction. The ingredients are cheap and may be obtained in any paint shop.

Resin (powdered)	40
White Shellac (in solution)	20
White lead (in oil)	70
Linseed Oil (raw)	10

Dissolve the resin in the white lead (the oil acting as the solvent) by the aid of a little heat. When thoroughly mixed and while still warm, add the white shellac and the linseed oil. Preserve in a tightly closed jar.

The mixture when cool becomes quite firm and if further it is exposed to the air it becomes securely set. The cement is warmed before use and applied in the consistence of thick honey. The surface upon which it is applied must be clean and free from moisture. The cement will set in 24 hours, but becomes harder for several days.

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* Read at the meeting of the International Association, London, August, 1913.

THE SEALING OF MUSEUM JARS.*

By Wm. Muir and Ernest Lionel Judah,
Medical Museum, McGill University, Montreal.

Ever since square jars came into use for the exhibition of museum specimens, difficulty has been experienced in finding a cement that would hermetically seal on the cover and at the same time permit of its easy removal when required, and which would also undergo contact with fluids without being dissolved. In fact so much trouble has been experienced that in some institutions the use of square jars has practically been discarded.

After trying various cements for the past twelve years, the following formula has been found to give the best results, i. e., it will withstand such fluids as Alcohol, Formalin and Kaiserling No. 3, and will also allow for the necessary amount of expansion and contraction:

Trinidad Lake Asphalt	1200 grams.
Boiled Linseed Oil	170 c.c.
Oil of Amber..............................	30 c.c.

Heat the oils in a quart enamel saucepan, adding slowly 400 grms. of finely broken asphalt and allow to boil for half an hour, then set aside until cold. Add balance of asphalt, 200 grms. at a time, and boil for half an hour allowing the cement to cool between each addition. Any debris floating on the surface of the hot cement must be carefully skimmed off. After this the mixture must be boiled for a period of three-quarters of an hour until hard enough for use; *i. e.*, until a finger print leaves a slight impression on the surface when cold. In a very warm climate, however, it may be necessary to add another 200 grms. of asphalt, or to boil a little longer.

While difficult, yet it is possible to boil down the mixture with only 600 grms. of asphalt, thus making a much more elastic and better cement, but in this case it is hard to prevent the formation of a skin, such as is found on partially dried linseed oil. This must be always avoided.

When hard enough for use, pour into small evaporating dishes which hold sufficient for the sealing of about twenty-five jars. By so doing, the cement is prevented from over hardening which impairs its elasticity.

When mounting specimens in fluid under Petri dishes where two wet surfaces are to be cemented together, a cement, the consistency of which is less firm, must be used. In this case that degree of consistency may be obtained at which the cement can most easily and conveniently be manipulated by the fingers under water.

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* Presented at the 6th Stated meeting of the International Association of Medical Museums, London, August, 1913.

In our experience, the common Trinidad Lake Asphalt has been found to give better results than the refined, because of the higher degree of elasticity which it possesses. Any foreign matter is usually precipitated and may be left in the pan when pouring out.

DIRECTIONS FOR USE.

Bore a small hole in the back left hand corner of the cover.

Fill jar to within about an inch from the top, then thoroughly clean both top edge of jar and cover, so as to remove all dirt or grease.

Heat the cement very slowly in a sand bath until quite liquid, being careful that it does not smoke or burn.

Heat top edge of jar with a Bunsen flame until it is just too hot to put your hand on, then apply the cement with a knife, keeping the edge of the jar to which the cement has not yet been applied hot with the Bunsen. When the cement has been applied to all four edges, re-heat cement and top of jar until the latter is quite liquid, being careful not to burn it or that it does not run down inside the jar while the cement is being applied to the jar. The cover should be heated on a thick asbestos plate until you can just hold it in your hand, moving it around so that it will heat evenly.

When the cement, top of jar, and cover are all hot, put the latter in place and press firmly down into the cement, forcing all superfluous cement to the outer edge, it having been applied in the first place so that it will run to the outer instead of the inner edge.

While the cement is still hot, scrape off the surface even with the jar and allow to stand over night, or until thoroughly cold, then clean with benzin and give the exposed surface a coat of jap-a-lac. Do not allow any fluid to touch the cement until it is thoroughly set and cold.

After the varnish is dry, fill the jar with fluid through the hole in the cover until it reaches the level of the cement but do not touch the cover. You can then seal the hole with a cork and drop of hot cement.

If there should be any leak in the seal when finished, stand the jar on the side and press in with a hot knife a little fresh cement, finishing off in the usual way.

SERIES OF SIZES FOR SQUARE MUSEUM JARS IN USE AT THE MEDICAL MUSEUM OF McGILL UNIVERSITY, MONTREAL, CANADA.*

By E. L. Judah, McGill University.

With the object of having Medical Museums adopt a standard set of sizes for their square Museum Jars, the following sets of jars have been worked out and verified during the past fifteen years.

At the Medical Museum of McGill University we have always had our square jars made to order, the sizes submitted by different manufacturers being most unsuitable for Medical Museums work. Their dimensions having been worked out to scale, with no thought as to shape or size of the specimens for which they were to be used.

Our list of jars are grouped into seven different sets, the object being to put the specimens into as small a jar as possible and still maintain its correct anatomical position. It must be remembered that we do not always use the jars for organs in the order given below. Pathological conditions so often change both the shape and size of the specimen. But they are taken as a general average, and you will be able to mount almost any pathological or anatomical specimen with the exception of very much enlarged organs in the following jars, the dimensions given being in centimeters:

LIST OF JARS.

HEART JARS.

SIZE NO.			
1	17	x 19	x 13
2	19	x 13	x 13
3	17	x 11	x 11
4	14½	x 12½	x 9½
5	13	x 12	x 9
6	12	x 10½	x 7½
7	10	x 5	x 4
8	8	x 4	x 3

INTESTINE AND ARTERY JARS.

SIZE NO.			
30	29	x 15	x 7
31	24	x 15	x 7
32	19	x 15	x 7
33	32	x 9	x 5
34	29	x 9	x 5
35	25	x 8	x 4½
36	20	x 7½	x 4
37	18	x 7	x 3
38	18	x 4	x 1½
39	14	x 4	x 2
40	10	x 4	x 2
41	6	x 4	x 1½

GENERAL UTILITY JARS.

SIZE NO.			
10	25	x 21	x 10½
11	22	x 19	x 9
12	22	x 16	x 9½
13	20	x 17	x 7
14	19	x 14	x 6½
15	18	x 13	x 5½
16	17	x 12	x 5
17	16	x 11	x 4
18	15	x 10½	x 4
19	14	x 9	x 3
20	14	x 9	x 2½
21	13	x 9	x 4
22	12	x 9½	x 3
23	11	x 9	x 2½
24	10	x 8	x 3
25	9	x 8	x 2½

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* Read at the meeting of the American Section, St. Louis, April, 1915.

26	8 x 7 x 2½
27	19 x 6 x 4
28	18 x 5 x 3½
29	18 x 4 x 3

STOMACH AND UTERUS JARS.

SIZE NO.	
42	19 x 27 x 12
43	17 x 22 x 10
44	16 x 22 x 8
45	13 x 20 x 6
46	12 x 18 x 5

KIDNEY JARS.

47	17 x 17 x 7
48	16½ x 16½ x 5½
49	13 x 14 x 4

PLACENTA JARS.

50	22 x 22 x 7
51	21 x 21 x 5

EYE JARS.

52	5 x 5 x 2
53	4 x 4 x 2
54	4 x 4 x 1

These jars are made without foot or lower border or projecting upper rim, the front surface being planed and polished. Each jar is supplied with a plain glass cover, the lower border of which is ground to meet the upper border of the jar which is also ground. A small 3 mm. hole is bored in the left hand back corner of the cover, through which the jar is filled when sealed, it also acts as a safety valve to allow for the exhaustion and contraction of the fluid. (See Muir and Judah on The Sealing of Museum Jars, Bulletin No. V, International Association of Medical Museums).

While specially made jars are undoubtedly expensive, they are economical, inasmuch as they save in fluid and shelf space and are much lighter to hand around a class than a jar several times as large as the specimen.

In ordering jars it is well to remember that buying direct from the manufacturer (not through an agent) will reduce the cost about 50%. While in Germany some three years ago I was able to cut our Museum Jar account in half and was promised a still greater reduction if I could get other Museums to adopt one standard set of sizes.

RAPID METHOD OF CLEANING BONE.*

By E. L. Judah.

For the rapid cleaning of small skeletons or bone specimens where it is necessary to keep the capsular ligaments intact, a 10% solution of Caustic Soda gives excellent results.

Remove all flesh possible from the specimen, then place in caustic soda for 5 to 10 minutes, remove and wash well in hot water, brushing off the flesh with a stiff nail-brush or tooth-brush . This process must be repeated several times until the desired result is obtained.

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* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, Mo., April 1st, 1915.

Great care must be taken not to leave the specimen too long in the Soda Solution, the object being to remove all flesh without injuring the capsular ligaments. These will also become macerated unless care is exercised.

When all the flesh has been removed, if the specimen shows any signs of grease, soak in gasoline until all fat is removed, then bleach in 10% hydrogen-peroxid.

Objections to this method have been raised on the ground that the soda solution will attack the outer surface of the bone, making it soft or scaly in the same way that bleaching with chloride of lime does. This seems, however, impossible in view of the fact that the delicate capsular ligaments are kept intact and are not affected by the solution.

In the London University Medical School where I saw this method used, they cleaned even the finest fish skeletons in this way, and got most excellent results.

A METHOD FOR PERMANENT EXHIBITION OF TISSUES IN AGAR-AGAR BETWEEN GLASS-PLATES AND THE MICROSCOPICAL APPEARANCE OF THE SAME.*

By J. H. Hewitt.

(From the Pathological Laboratory of the Cleveland
City Hospital and the Western Reserve Medical
School, Cleveland, Ohio.)

The method consists in mounting in 1% agar-agar, to which a small amount of thymol has been added, thin tissues or slices of organs between plates of glass, as has already been described (1). The mount is then framed as a picture, using as a moulding ordinary picture-framing, or special moulding may be obtained from manufacturing houses. I have always used the former and have found that when it is desired to exhibit only one surface of the specimen it is nearly always necessary to build up the back of the frame to make it as thick as the mounted specimen. This can be readily accomplished by tacking successive layers of strips of splint-board around the back of the frame till the desired thickness is obtained. If it is desired to exhibit both surfaces of the specimen the moulding is placed on both the front and the back edge and the two strips fastened together with furniture glue and screws.

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* Read at the meeting of the American Section of the International Association of Medical Museums, St. Louis, April, 1915.

When it is desired to exhibit permanently only one surface of the specimen the mounted and framed object is attached to a thin wooden board of suitable size the exposed surface of which is covered with black leatherette paper. It can be fastened to the board by running screws through the back into the margin of the frame. When several related specimens are to be exhibited together they may all be placed on a single board, as in Fig. 1. For these larger boards, known as compo-board, can be obtained in any ordinary size desired. These boards are rather thin and pliable and have to be reinforced with strips of wood across the back, as shown in Fig. 2. The board is next framed, as the individual mounted specimens, and hooks and wires may be placed on the back for hanging on the wall; or, when the whole exhibit is very large and heavy, it may be placed on an easel.

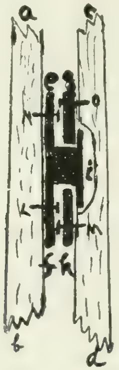

FIG. 4.—A PLAN OF A FORM OF REVOLVING HINGE FOR MOUNTING FRAMED SPECIMENS THAT ARE TO BE VIEWED ON BOTH SURFACES.

ab AND *cd* REPRESENT THE MOULDING. *eif* AND *gh* ARE THE TWO PARTS OF THE HINGE, WHICH IS SHADED BLACK, *k*, *n*, *o*, AND *m* ARE SCREWS HOLDING THE HINGE TO THE UNBEVELED EDGE OF THE MOULDING.

When it is desired to exhibit both sides of the specimen a prepared board is obtained and a square opening large enough for the framed specimen is sawed in the position the specimen is expected to occupy. A second frame is glued and screwed around the margin of the opening, as shown at *a* in Fig. 3. The specimen is attached to the margin of the outside frame at a point a little above the middle by a revolving hinge passing between the two frames. The hinge is made of brass. A diagram of its construction is shown in Fig. 4. Of course its size has to vary with the size and weight of the specimen.

For the microscopic appearance of the specimen, or any part of it, autochrome microphotographs of the part desired are prepared. These may be of any size or of any magnification wished. As the plates are rather expensive, I have used entirely the lantern-slide size, 3¼ x 4 inches. Such slides have the further advantage that they may at any time be used in a lantern for demonstration or lecture. Though there are a number of makes of autochrome plates my experience has been confined almost entirely to those manufactured by Lumiére and Sons of Lyons, France. Low power and high dry microscopic images can be almost exactly reproduced in the colors with which the tissue is stained. I have also obtained fairly satisfactory pictures in colors of stained bacteria with these plates.

The plates when developed and finished are not photographs but transparencies or lantern slides and it is only by the use of transmitted light that the image with its colors can be seen. The autochrome plate when finished is covered with a mat and cover glass and the edges sealed with adhesive strips like an ordinary lantern slide.

For exhibition these slides, one or as many as desired, may be placed beneath the corresponding gross specimen in small boxes, of the construction shown in Fig. 5. The slide is placed in the receptacle on the top of the box and the image is viewed in the mirror placed beneath and at an angle of 45 degrees to the top and the slide.

It is necessary to have a light to illuminate the transparency plates. For this purpose the reflector and lighting attachment, as shown at *b* in Figs 1 and 2 and diagramatically in Fig 6, was designed. A 25 Watt frosted Madza lamp is used in it. The lamp must not be placed nearer than 6 inches above the transparency, otherwise the heat is liable to crack and mar the film. The boxes are fastened to the board by screws passing through the back of the board and into the edges of the sides of the boxes.

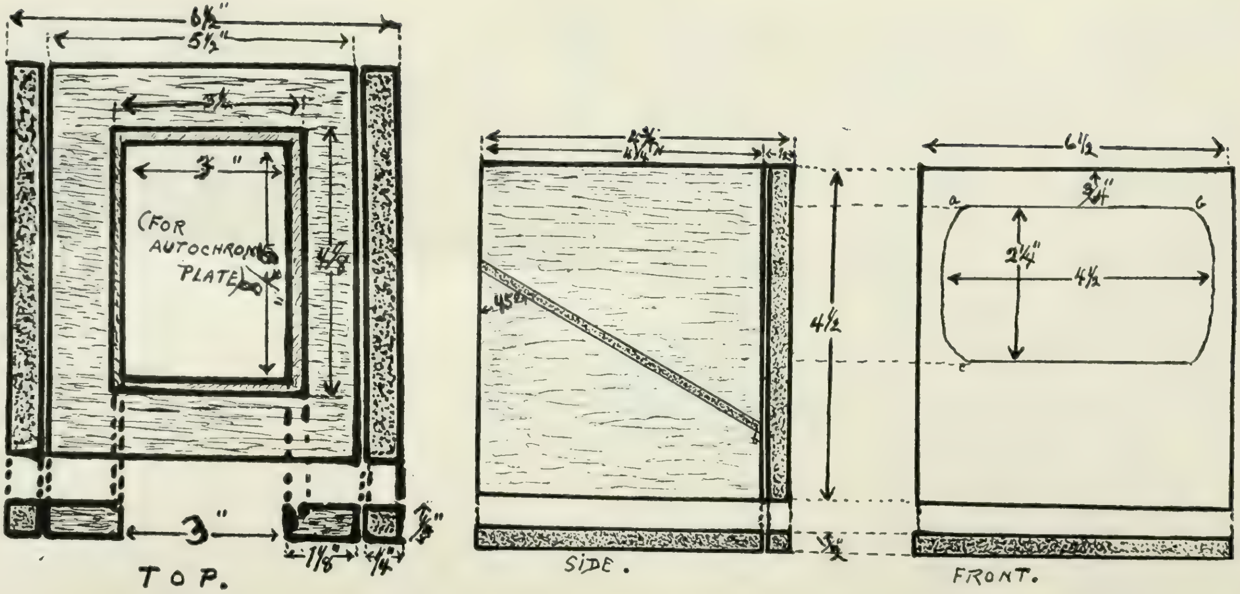

Fig. 5.—Plan of the Top, Sides, and Front of the Box that Holds the Autochrome Transparency.

ab, on the Plan of the Side of the Box, Represents the Grooved Depression for the Reflecting Mirror. The Plans are Diagrammatic and not Drawn to Scale.

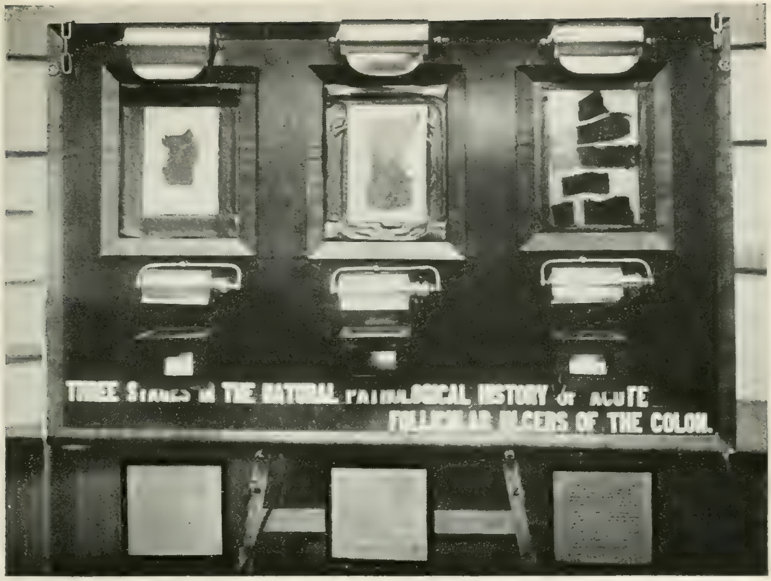
THREE STAGES IN THE NATURAL PATHOLOGICAL HISTORY OF ACUTE
FOLLICULAR ULCERS OF THE COLON.

Fig. 1.—An Exhibit Consisting of Three Specimens, to Demonstrate Different Stages of the Same Condition, Attached to a Single Board.

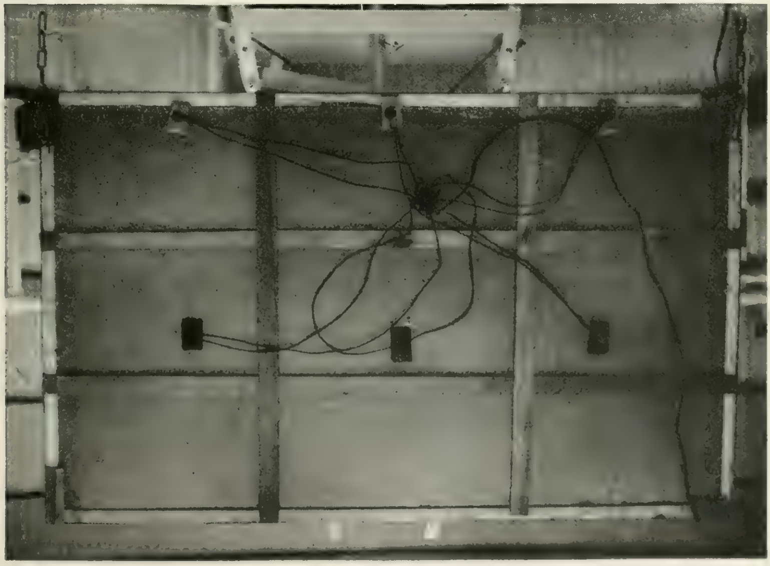

Fig. 2.—The Back of the Exhibit Shown in Fig. 1, Demonstrating a Method of Bracing the Frame and Board when Compo-Board is Used.

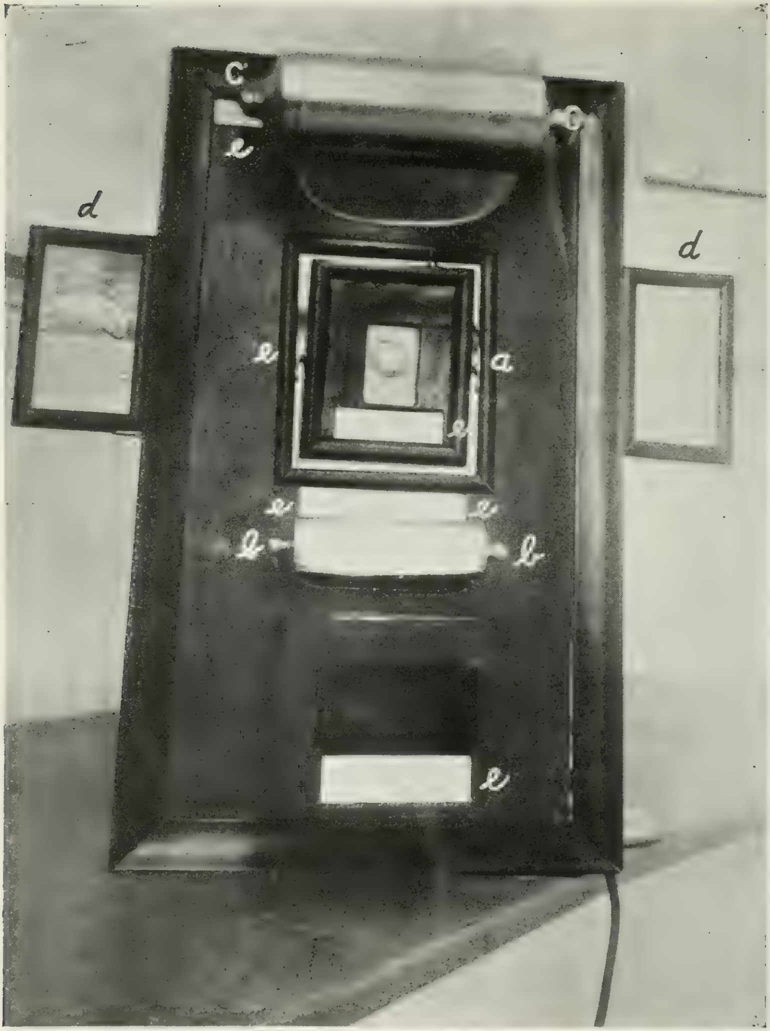

Fig. 3.—A Form of Exhibit when the Specimen is to be Viewed on Both Sides.

The two reflectors, shown at *c* in Figs 1 and 2, are not necessary where the exhibits are shown in full daylight. However the light adds materially to the clearness of the specimen and the specimens may be exhibited at night or in dark rooms when desired. The shade used for this purpose is known as the Dale Tubular Shade and can be purchased at electrical supply houses. An 18 Watt tubular Madza lamp is used in it.

Those specimens, only one surface of which is to be demonstrated, are rendered clearer and the agar-agar more transparent by painting or spraying the back glass-plate that is next to the board with aluminum bronze. The bronze can be purchased prepared at hardware stores or it can be prepared by mixing powdered aluminum with banana oil. Another and better, but more expensive, method of obtaining a reflecting surface at the back is to use a silvered mirror for the back glass-plate.

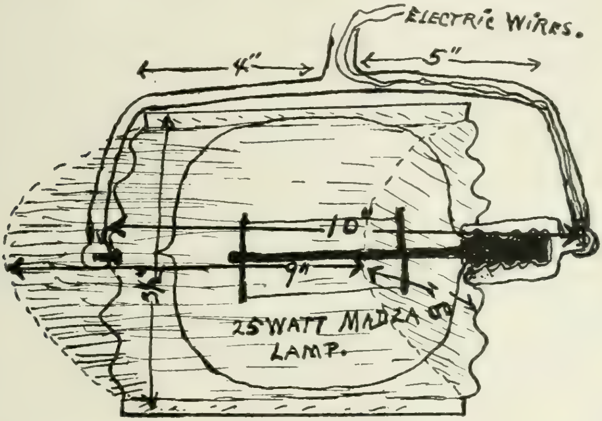

FIG. 6.—A DIAGRAMMATIC PLAN OF THE REFLECTOR USED TO CAST THE IMAGE ON THE AUTOCHROME TRANSPARENCY INTO THE VIEWING MIRROR.

Written or printed histories and descriptions, as well as photographs of clinical appearances associated with the specimen, may be attached to the exhibit, as shown at *d* in Figs. 1 and 2. Other legends may be pasted on the board or marked on the surface of the glass-plate with India ink, as at *e* in Figs. 1 and 2.

Microscopic Technique

A METHOD OF MACERATION, PREPARATORY TO TEASING.*

By G. Carl Huber,
Department of Anatomy, University of Michigan.

Successful teasing of organs is dependent on a thorough and uniform maceration of the interstitial portions without at the same time softening and destroying the parenchymatous structures to such an extent that the necessary manipulations are precluded. The majority of maceration methods depend on the action of dilute acids, the pieces of tissue being placed in the respective solutions for a time sufficient to attain the desired degree of softening. The writer's especial interest in maceration methods is synchronous with his attempts to isolate completely the mammalian renal tubule. The various current methods having proven inadequate, the following method was devised. The efficacy of the method developed depends on the use of a concentrated hydrochloric acid solution, which is injected into the vascular system. It was found that by this means a much more thorough and uniform maceration could be obtained than when the tissues are immersed in dilute acid solutions. The method as now used is as follows:

As a macerating fluid I now use a solution made by diluting 75 parts of HCl, sp. gr. 1.21, with 25 parts of distilled water. This is rapidly injected through a canula, filled with normal salt solution or distilled water, tied into the artery supplying the organ or tissue to be investigated, and under a pressure of from 10 to 20 pounds, continued until the parts seem well injected. The tissues are then removed, and if necessary cut in suitable planes, the resulting pieces having one diameter not to exceed 1 cm. and transferred to a concentrated hydrochloric acid solution, the same as used for the injection. It is advisable to inject several specimens at the same sitting, and remove them from the macerating fluid at different intervals. The optimum degree of maceration can only be approximated, the extent of the injection and other factors not readily controlled, influencing the time required for thorough and uniform maceration. A four hours' stay in the macerating fluid may be given as an average. Some experimenting with different organs and the organs of different animals is required to attain optimum maceration in a given organ. When the desired degree of maceration is thought to have been obtained, the material is transferred to distilled water. The removal of the pieces from the acid to the distilled water is best accomplished by pouring off most of the acid, leaving only sufficient to allow the tissue pieces to float. Distilled water is then slowly added. This process is repeated at intervals of a few minutes until all of the acid has been removed. In the course of about 30 minutes, the pieces which are soft and transparent after maceration in the acid, lose their transparency and become quite firm. They remain in the distilled water, which is changed at intervals, for about 24 hours. A longer stay, however, is not injurious. The material may now be subjected to preliminary teasing, the larger pieces being separated along desired planes so as to obtain smaller pieces having a diameter of 3 to 5 mm. in one diameter. These are now transferred to Mayer's haemalum solutions, diluted with about two parts of distilled water, in which they remain for from 24 to 48 hours. They may, however, remain in this solution for weeks, without injury. Staining of the material, as here suggested is recommended for several reasons. The haematoxylin solution hardens the tissue somewhat, and the tissue elements are much more readily followed, during the teasing process. The final teasing is carried out in deep Syracuse watch crystals or flat Petri dishes, under the stereoptic binocular, and in slightly ammoniated distilled water, prepared by adding a few drops of a 0.5 per cent solution of ammonium hydrate to the water. The ammonia of this fluid develops the stain to deep purple, makes the pieces somewhat transparent and softens them so that they become quite pliable. The teasing requires experience and patience, the results, however, are extremely gratifying. It has been possible by means of this method to isolate complete renal tubules of mammalian kidneys (Anat. Record, Vol. 5, 1911) complete seminiferous tubules of the rabbit, having a length of over 30 cm. (Anat. Record, Vol. 7, 1913) and entire striated muscle fibre to 5 cm. in length, etc. With thoroughly macerated and well stained tissues at hand, the complete isolation of such structures is not so difficult if the teasing is carried on in a quantity of water of sufficient depth so that the teased parts may float about readily.

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* Presented at the meeting of the International Association of Medical Museums, London, August, 1913.

The making of permanent mounts of such structures is not simple, and one often meets with failures. The following method of mounting has given on the whole the best results. The structures are partially teased in a Petri dish and are then transferred to a large slide (75 x 50 mm.) about the edges of which is built up a rim consisting of soft paraffin, so that the slide will hold a layer of distilled water having a depth of about 3 to 5 mm. In this layer of water the final teasing is undertaken. When completed, the structure is adjusted as desired in the final mount and the water very carefully and slowly withdrawn by means of a small pipette and strips of filter paper, so that the teased structure may rest on the slide. The rim of paraffin may now be removed and the slide cleaned and placed on the warm oven to hasten the evaporation of the water adhering to the tissue. If care be taken a stage is reached when the teased tissue will adhere to the slide sufficiently to admit of mounting, but it has not been distorted as after more complete drying. For mounting a layer of glycerin is placed on a large cover glass and this lowered very slowly and carefully from one edge. The preparation may now be sealed in the usual way. For examination as for the teasing a stereoscopic binocular is essential. It is hoped the method may have its application in pathological as in histological investigations.

STAINING OF TISSUES GROWING IN VITRO.*

By Robert A. Lambert,
Department of Pathology, College of Physicians and Surgeons,
New York.

The staining is best carried out on very thin hanging drop preparations. The cover glass with the attached plasma clot is placed clot side up in a dish of fixing fluid. Formalin (10%) is for most purposes the fixative of choice, since the opacity resulting from protein coagulation, is much less marked than with alcohol or bichloride-containing fixatives. If, however, on account of subsequent staining methods, one of the latter fixatives must be used, the opacity can be, to a large extent, avoided by washing the culture for several hours in Ringer's or salt solution before applying the fixative, or, less satisfactorily, by prolonged washing in water after fixation. The first procedure has the disadvantage of delaying fixation, which in certain studies, as for example, upon cell division, may not be at all desirable. Fixation is accomplished in less than five minutes in formalin or Zenker's fluid, if the preparations are thin.

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* Presented at the meeting of the International Association of Medical Museums, London, August, 1913.

The cover glass specimens may be transferred directly from the formalin dish or the washing dish to the staining dish. We have found Weigert's iron hematoxylin the best stain for general use. Cytoplasmic stains are not desirable since, as a rule, they stain the clot itself rather deeply.

Since the cells practically always contain fat granules Sudan III followed by Delafield's or Weigert's haematoxylin gives a beautiful stain. The best results are obtained by overstaining the preparations with haematoxylin and then decolorizing slowly in weak acid alcohol. In this way the stained fibrin may be decolorized leaving the cells standing out sharply. The time required for staining varies with the tissue. Chick tissues, for example, stain much more slowly than rat tissues.

The subsequent treatment of the preparations is the same as for celloidin or paraffin sections, the cover glass and clot being carried through alcohol and clearing agent, just as one would a single celloidin section, except that the time required for dehydration and clearing is somewhat longer.

If paraffin sections of the cultures are desired for any reason, the plasma clot must be removed from the cover glass. This should not be done until the specimen has been fixed, or indeed it may be advisable to delay removal until the stage of embedding is reached. The clot is best removed by gently scraping it off with a sharp knife or razor, the blade being held firmly against the cover glass. We have found safety razor blades very useful for this purpose. The disc shaped clots upon being embedded become nearly or quite invisible in the paraffin, so that it is advantageous to have the clot stained beforehand. This can be done immediately after fixation using any stain that is not readily decolorized by alcohol. We have found haematoxylin quite satisfactory.

VITAL STAINING.*

By Lydia M. DeWitt, Chicago.

During the last five years, the benzidin azo dyes, trypan blue and trypan red, introduced by Ehrlich and investigated by Goldmann, with numerous allied and derived dyes, have been the most popular and the most widely used and studied of the many so-called vital stains. As these however, will no doubt be thoroughly discussed by those who preceded me in this symposium, I will limit myself to giving in a few words my own experience with these dyes and with some modifications of them which have been made for me in my laboratory. Of late, my interest and work with vital stains have been connected with tuberculosis chemotherapy. Since penetration of the tubercle is the first requisite in a therapeutic agent, the vital stains have been especially useful because of the ease with which the fact of penetration could be demonstrated. Early in my experiments, I found that both trypan blue and trypan red easily penetrated tubercles of all ages and in all stages of development and were retained in the tuberculous tissues for long periods. The appearance of the stained tubercle, however, was quite different from that of the normal tissue; the deeply stained intracellular granules of the latter being replaced by a diffuse, more homogeneous and lighter colored stain such as is found in other dead or injured cells. The toxicity of these dyes is low and from 3 to 5 cc. of 1% solutions can be given semiweekly for long periods to guinea pigs without apparent damage to the general health of the animals and local necroses were almost unknown. Larger doses often proved immediately fatal. Notwithstanding the easy penetration of the tubercle and the long duration of the effect, these dyes have not proved successful in the treatment of experimental tuberculosis in the guinea pig. They do not sharply stain the individual tubercle bacilli and have very little, if any, tuberculocidal or even inhibitory power. Guinea pigs treated with these dyes for months beginning immediately after inoculation with human tubercle bacilli, developed the disease promptly and died of local and general tuberculosis at about the same time as did the controls. I then made an attempt to increase the bactericidal power of trypan blue without diminishing its penetrating power. Copper, iron, silver and two mercury salts of trypan blue were made, these heavy metals displacing the sodium in each sodium sulphonate group. These metallic salts, like trypan blue itself, were, with the exception of the two mercury salts, easily soluble in water, the solutions being deep blue in color, while the crystals had a glistening bronze luster. The iron and silver salts penetrated the tubercle as well as did the trypan blue and more specifically, as the normal tissues were not so well stained as with the original dye. The copper salt, on the other hand, was held in a gelatinous mass at the point of injection and did not diffuse through the body. The mercury salts, which, on account of their insolubility, had to be used in a fine suspension, failed to diffuse and no trace of the dye was seen either in the tubercles or in the normal tissues. Both of these non-diffusible dyes were strongly necrotizing and could be used therefore only in small doses and in low concentration. Some attempt was made to determine whether the metals were carried into the tubercle, but without success. I was in no case able to demonstrate the presence of the metals in the tuberculous tissue. None of the metallic salts except the mercury had any bactericidal or inhibitory effect on the tubercle bacillus *in vitro* or on the development of the tuberculous process *in vivo*. The two mercury salts, on the other hand, were strongly tuberculocidal so that organisms which had been exposed to either the mercuric or to the mercurous salt, when injected into guinea pigs had no effect either local or general. Guinea pigs infected with human tuberculosis and subsequently treated with the mercurous salt of trypan blue lived considerably longer than the other animals of the series and showed but slight tuberculous involvement, the death being due to other causes. As the mercuric salt contains about 32% and the mercurous salt about 48% of mercury, it is perhaps not surprising that these salts should be more effective than the others.

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* Read at the Meeting of the International Association of Medical Museums, Toronto, April, 1914.

Tuberculous organs stained vitally with the iron, and silver salts of trypan blue were in some cases fixed entire in Kaiserling. The color was well preserved for several months and might have been preserved longer, if greater care had been taken with the fixation. I have no doubt that permanent gross specimens could be made of organs well stained vitally with any of these dyes.

METHYLENE BLUE.

A symposium on vital staining could scarcely be considered complete without reference to the services which Methylene-blue, the oldest and best known of the vital stains, has rendered and may still render to medical science. This dye was introduced as a vital stain by Ehrlich in 1886; its first use was in the study of the nervous system, and numerous investigators following Ehrlich have used this "intra-vitam" staining with methylene blue and much of our present knowledge of the course and terminations of nerve fibers, as well as to a certain extent, of the structure and relations of neurones in the central nervous system and its peripheral ganglia has been acquired from the beautifully clear and instructive pictures given by this method. The specially purified preparation known as *"rectifiziert nach Ehrlich"* is the best one for vital staining. Dr. Huber and myself, a number of years ago, studied by means of the "intravitam methylene blue method" many of the special sensory nerve endings as well as the motor endings in the different types of muscle and also certain of the free sensory endings. We usually injected into the aorta or large local artery of the just killed animal a dilute solution of Ehrlich's rectified methylene blue in normal salt. The dye quickly diffuses through the entire body or through the part injected, but the blue color quickly fades, the dye becoming reduced to the colorless leucobase. Exposure to the air is then necessary to reoxidize the dye. The reoxidation is complete first in the nerves and nerve endings, and if the oxidation process is stopped at the right time, these nerve tissues, even to their finest branches and terminations, stand out beautifully blue and clear against a nearly unstained background. Over-oxidation causes all the tissues to become diffusely blue so that the sharpness and beauty of the picture is destroyed. The oxidation can be stopped by placing the tissues in a fixing solution consisting of ammonium molybdate at a temperature just above freezing, if the tissues are to be embedded in paraffin and sectioned, or into ammonium picrate and glycerin if teasing is to be resorted to. By either of these methods of preservation, beautiful and fairly permanent preparations of these blue stained nerve tissues can be made. The ammonium molybdate fixed tissues can be rapidly dehydrated and embedded in paraffin, cut in thin sections and counterstained with alum cochineal or alum carmine so that the relation of the nerves and nerve endings to the surrounding tissues can be clearly brought out.

Bensley has used with great success methylene blue as well as neutral red, pyronin and Janus green in the study of glandular cells and their granulations. His results in the cells of the digestive system and pancreas are well known and especially valuable.

DYES.	PENETRATION	GENERAL TOXICITY.	LOCAL TOXICITY	THERAPEUSIS.	STAINING OF BACILLUS	INHIBITORY ACTION.	BACTERICIDAL ACTION
Methylene Blue	+ +	+	+ + +	— ?	+ + +	+ + + +	+ ?
New Methylene Blue N	+ +	+	+ + +	—	+ + +	+ + + +	—
" " " GG	+ +	+	+ +	— ?	+ + +	+ + + +	+ ?
" " " R	+ +	+	+ + +	—	+ + +	+ + + +	?
" " " GB	?	+	+ + +	—	+ + +	+ + + +	?
" " " NSS	?	+	+ + +	—	+ + +	+ +	?
" " " NX	+ +	+	+ + +	—	+ + +	+ + + +	?
" " " 3R	?	+	+ + +	—	+ + +	+ + + +	?
[illegible] Blue	+ +	+	+ + +	—	+	+ + + +	—
[illegible] Blue	+ +	+	+ + +	—	+	+ + + +	—
Trypan Blue	+ + + +	+	—	—	+	—	—
" Red	+ + + +	+	—	—	+	+	—
[illegible] Trypan Blue	+ + + +	+	+	—	+	+	—
Copper " "	—	+ + +	+ + +	—	+	+	—
Iron " "	+ + + +	+	+	—	+	+ + + +	—
Mercury " "	—	+ + +	+ +	+ ?	+ + +	+ + + +	+ +

FIG. 1

Methylene blue was also early used as a vital stain for lower plant and animal life; and vacuoles of yeast cells, granules of protozoa, intracellular granules of bacteria and also fungi and many other forms were successfully stained with methylene blue without destroying the life of the cells. It was however early shown to be more or less toxic to these lower forms of life and for that reason it was as early as 1880 suggested as an internal antiseptic. It has been and still is used more or less effectively as a germicide, especially in infections of the genito-urinary tract. Therapeutically it has been used as an analgesic in neuralgias, rheumatism, etc., and also instead of quinine in the treatment of malaria. In tuberculosis, methylene blue was first used therapeutically by Einhorn in 1891 and during the last two years enthusiastic reports of its efficiency either alone or combined with copper, in the internal treatment of tuberculosis have been published by v. Linden, Strauss, Meissen, and others.

In the beginning of my work with tuberculosis and vital stains and some time before the publication of the above mentioned German reports, methylene blue was one of the earliest dyes used. Numerous preparations of methylene blue are on the market, but most of them contain too much arsenic and zinc for safe use in the living animal body. I first used therefore the methylene blue *rectifiziert nach Ehrlich* which I had used in my earlier vital staining of the nervous system and later I found the pharmacopeal preparations better for continued use during the life of the animal. Even with these purified preparations, only small doses could be injected without causing local necrosis. Somewhat larger doses could be fed, but this method of administration seemed less effectual. Both after long continued subcutaneous injections and after long continued feeding of methylene blue to tuberculous animals, the tubercles were diffusely blue, or became so after exposure to the air or to oxidizing agents. It was also found that outside of the body, the dye penetrated and stained the individual tubercle bacilli sharply and had a strong inhibitory and slight bactericidal power over the growth of these organisms. Although these facts made it seem reasonable to think that methylene blue might be efficient in the treatment of tuberculosis, the therapeutic experiments have proved disappointing. In no case could it be said that a case of experimental tuberculosis in a guinea pig was cured by the treatment with methylene blue and I have been unwilling to regard mere length of life as a criterion of therapeutic efficiency.

In the treatment of tuberculous guinea pigs I have also used certain modifications of methylene blue, such as the numerous so-called "new methylene blues" which are on the market and two new modifications made for me in our laboratories. In these latter the sulphur atom of the methylene blue molecule is replaced in the one case by selenium and in the other case by tellurium. The resultant dyes are soluble in water and are deep blue in color, but they are quite unstable and are weaker dyes both in staining power and in bactericidal and therapeutic influence than methylene blue.

The efficiency of the various dyes mentioned as used by me in the treatment of experimental tuberculosis in guinea pigs is briefly and graphically indicated in the table.

We have then, in Methylene-blue, a vital stain of a class quite different from that to which the azo-dyes, trypan blue, trypan red and their many analogues belong. Methylene blue is a basic dye, easily soluble, readily diffusible, not readily thrown out of solution. It has a special action on certain portions of the nervous system, but aside from that is a general protoplasmic stain. Like nearly all basic dyes, it stains the protoplasm of practically all cells of the body uniformly; or, if preformed granules stain, as may be the case with certain cells, their stain is not specific but the protoplasm is also lightly stained. Even in the case of the nervous system, the specificity seems to be dependent on prudent oxidation of the reduced dye, since this process occurs more quickly in the nerve tissues than in others.

Until the last five years, it was generally stated that only basic dyes could act as vital stains. The work of Goldmann, Schulemann, Evans and many others has introduced to us large numbers of acid dyes which stain beautifully and much more permanently than any of the basic dyes. The stain however is different, with the exception of the kidney cells and possibly some liver cells. Only certain connective tissue and endothelial cells are stained normally and in these the dye appears in the form of larger or smaller deeply stained granules. As the dyes are colloids and the cells are phagocytic in function, the conclusion seems evident that in the case of these acid dyes, the vital staining, if such it may be called, is due, not to diffusion and penetration of the dye in solution as in the case of the basic dyes, but to phagocytizing of the particles of the eye, perhaps combined with proteins. If then we regard these dyes as vital stains, we must enlarge our older understanding of the term to make it include the staining of still living tissues and cells by any process necessary for the introduction of the dye.

ON STAINING FRESH TISSUES FOR DIAGNOSTIC PURPOSES.

By Louis B. Wilson, Rochester, Minn.

Our experience in staining fresh tissue with Polychrome Methylene Blue for diagnostic purposes is most satisfactory. For those not familiar with the method published in The Journal of the American Medical Association, Dec. 2, 1905, it is herewith reproduced.

1. Fresh tissue, the cells of which must be still alive (*i. e.*, if not kept in the ice chest, not more than two hours out of the body) in bits not more than 2 x 10 x 10 mm. is frozen in dextrine solution on a good microtome and cut in sections 5 to 15 microns thick.

2. Remove the sections from the knife with the tip of the finger and allow them to thaw thereon, thus avoiding later development of air bubbles.

3. Unroll the sections with camel's hair brush in 1 per cent NaCl solution.

4. Stain 10 to 20 seconds in *Unna's* polychrome methylene blue, *Grübler's*.

5. Wash out momentarily in 1 per cent NaCl solution.

6. Mount in *Brun's* glucose medium. (See Lee's Vade Mecum). The Spencer automatic microtome with CO_2 attachment and vulcanite insulating plate, gives excellent sections. Handle the sections from first salt solution through to the slide with a small glass rod-lifter. Keep the sections constantly moving while in the stain. The smaller the stain cup the more readily tissue may be found in it if dropped from the lifter. If fluids for unstained sections are in clear glass over a black background, and those for stained sections are in white porcelain or clear glass over a white background, the work will be much facilitated. The various tissue elements are sharply contrasted in red, purple, and dark blue. Even mitotic figures, where present, are many times beautifully shown. The sections, of course, fade as they die and decompose. Formaldehyd-fixed material, first thoroughly washed in tap water, may be treated in exactly the same manner as fresh tissue. The color differentiation is materially different, but the process is of great convenience for the rapid examination of a great number of blocks from a given specimen.

ON THE TECHNIQUE OF PRODUCING FROZEN SECTIONS FOR RAPID DIAGNOSIS.*

By Sidney J. S. Peirce, M.D., Winnipeg.

This technique of producing frozen sections may be described as consisting of three steps.

1. Freezing the specimen.
2. Cutting the section.
3. Staining the section.

1. *Freezing.*—The older methods of freezing by ice and salt, or ether spray are cumbersome, tedious and uncertain in warm weather, and have, I believe, been entirely abandoned. Most satisfactory results are to be obtained by use of the intense cold generated by the rapid expansion of compressed carbon dioxide gas. The improved apparatuses of Sartorius (of Göttingen) and the Spencer Sons Co., (of Buffalo), which are merely paraffin microtomes with attachment for carbon dioxide spray below the stage, have rendered possible the attainment of frozen sections with the uniformity and certainty of paraffin sections.

2. · *Cutting the Section.*—The first essential is a sharp knife. If serviceable frozen sections are to be obtained the same critical care must be given to the edge of the microtome knife as is used in the paraffin technique. If the edge of the knife is to be preserved, some attention must be given to the exact technique of making the section. The portion of tissue to be cut is brought on to the stage of the microtome along with a small amount of adhesive substance such as a thick mucilage of dextrin, and with a few rapid puffs of the carbon dioxide spray the preparation is frozen throughout half its depth shown by a creamy-white line rising from below upwards. Inspection of the specimen will now show strata of varying hardness, from one of almost stony hardness next the stage, through one of a waxy consistence at the visible line of junction between the frozen and unfrozen part, to the softness of the unfrozen tissue above. Through the upper portion of this waxy layer, the first section must be made. Then one or two thick sections are made until tissue of the exact consistence required is reached and finally with a few rapid strokes of the knife the desired number of sections for examination are

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* Read at the meeting of the International Association of Medical Museums, Toronto, April 9th, 1914.

obtained. If an attempt is made to freeze the specimen throughout its whole substance or if the first section is made too low the edge of the knife is inevitably damaged.

3. *Staining the Section.*—The subsequent handling of the section is somewhat a matter of the taste of the operator and various methods are in vogue. One which seems to fulfill in every respect the requirements of a rapid technique is that perfected by Dr. L. B. Wilson of Rochester, Minn.[1] With this the writer has had some experience and can warmly recommend it. The steps of the technique are as follows:—The section is removed from the knife-blade by the tip of the finger and transferred to normal saline solution. In this, by means of a camel's hair pencil, it is persuaded to spread out and is then transferred by means of a delicate glass rod bent at right angles to a small dish containing well-ripened Unna's Polychrome Methylene Blue, a few seconds suffice for staining and the section is transferred by the glass-rod to normal saline to discharge the excess of color and thence to Brun's glucose. In this it is floated by means of the camel's hair pencil on to a glass slide, a cover-glass applied and it is ready for examination. Satisfactory preparations are obtained in ½ to 2 minutes.

In my own practice during the last two years I have used a modification of this technique, the reasons for the change being as follows:—A satisfactory specimen of Unna's Polychrome Blue is not always easy to obtain, it is a little unstable, and pictures obtained with it with formalin-fixed tissue are not so clear as with fresh material. The use of carbol-thionin was recommended by Dr. Wood of New York[2] and recently brought again into notice by Dr. S. Strouse of Chicago.[3] The method of preparation of the stain is as follows:—A saturated solution of thionin in distilled water is prepared, filtered and to it is added an equal volume of a 5% solution of phenol crystals in distilled water. The stain can be used immediately and improves with age. The method that I have been using is as follows:—The section is transferred from the knife to distilled water, thence into the stain for 5 seconds or less, thence into distilled water, thence into a second change of distilled water. In this it is floated onto a slide, a cover-glass applied and it is ready for examination. Quite clear preparation can be obtained. Cell nuclei are stained various shades of blue; mitotic figures are quite well shown and pyogenetic cocci come out sharply. Connective tissue fibres and cartilage take on various shades of pink. Amyloid stains a shade of green and medullated nerve fibres a brownish cast which is quite distinctive. Both fresh and formalin-fixed tissue are equally well stained, the latter staining somewhat more rapidly than the former. As with the polychrome blue the preparations are not permanent.

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[1] Wilson, L. B., Jour. Am. Med. Ass'n., Dec. 2, 1905, XLV 1737.

[2] Wood, F. C., Proceedings N. Y. Path. Soc. of 1901 (new series, i-II).

[3] S. Strouse, Jour. Am. Med. Ass'n., May 14, 1910. LIV 1614.

It will be seen that the only reagents used are the mucilage of dextrin for embedding the specimen, the carbol-thionin stain, and distilled water. A fair amount of experience with both stains has convinced me that the results to be obtained with each are practically identical; but I would insist that the carbol-thionin method that I have outlined has a degree of finality as to simplicity that for rapid work should serve to recommend it.

RAPID METHOD FOR STAINING MYELIN SHEATHS AND AXIS CYLINDERS SIMULTANEOUSLY (WEIGERT MODIFIED) SUITABLE FOR CELLOIDIN, PARAFFIN AND FROZEN SECTIONS.*

By Georgine Luden van Heumen, M.D.,
Munich, Germany.

The facts that Weigert's famous stain for medullated nerve fibres necessitates the use of the paraffin oven, that distilled water must be used and that no results can be obtained in less than 24 hours, have led me some years ago to try and find some method that would be as simple, rapid and reliable as an ordinary Haematoxylin-Eosin stain.

I tried all the staining methods of which I could find an accurate description without finding amongst them exactly what I wanted. From the outset I had made up my mind that this new method was to meet the following requirements:

(1) Uniform results must be obtained by using cold solutions and ordinary tap-water.

(2) The whole proceeding must not take longer than an ordinary Haematoxylin-Eosin stain.

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* Presented at the meeting of the International Association of Medical Museums, London, August, 1913.

(3) The chemicals used must be either cheap or suited to be used repeatedly.

(4) All nuclei must be made distinctly visible.

(5) It must be possible to "restrain" sections, that do not show satisfactory contrasts.

(6) The results must be as like the Weigert stain as possible.

(7) The sections must permanently retain their original colours, even when exposed to the light.

I feel confident, that the method which I now publish—the result of experiments extending over some three years and a half —will be found to meet all the above stated requirements.

Even the oldest specimen of my collection—a case of locomotor ataxia made in 1910 and unfortunately damaged by pressing down the microscope upon it, shows every detail with the same clearness and brilliancy of colours as the day it was made.

As stated above, the method gives satisfactory results for material embedded in celloidin, in paraffin ("slow method"): Shennan: Postmortems and morbid anatomy, (page 446) and with frozen sections. It must be remembered, however, that frozen sections stain very rapidly and should therefore not be left longer than about 2 minutes in each solution.

The fixing and hardening agents used have been 10% formalin or Müller's fluid with formalin ("Müller-formol"), and alcohol as usual. I never have tried fixing and hardening in alcohol *only*, nor the corrosive sublimate method, nor in Zenker's fluid. Excellent results have been obtained for frozen sections made after "rapid fixation" (Shennan) with 10% formalin in water, boiled for one or two minutes, but I did not try Pick's, Jores' or Kaiserling's fixing fluids for rapid fixation.

Celloidin embedding as usual.

Paraffin embedding (slow method). Experiments have proved to me that the unsatisfactory results which most medullated nerve stains give are not due to the effect of *warmth* (in the paraffin oven) on the myelin sheaths. Hearing that most lipoids are soluble in benzol composites I concluded that the myelin sheaths were spoilt by the use of xylol (dimethylbenzol) before embedding. I have found this surmise to be correct, as when *cedar oil* was used instead of xylol, absolutely satisfactory results could be obtained.

I treat the tissue as follows:

(a) Fixation in 10 per cent formalin (or Müller-formol) as usual.

(b) Hardening in alcohol: in 70%—96%, and finally absolute alcohol some six hours each.

(c) *Cedar Oil.* For at least 24 hours; cedar oil does not seem to affect the tissue in any way; pieces kept in it do not shrink nor deteriorate in the least. The oil can be used almost indefinitely without renewing.

(d) *Melted Paraffin I.* (Melting point 40—45°.) Change twice at least to extract every trace of cedar oil.

(e) *Melted Paraffin II.* (Melting point about 58—60°.) Pieces to be kept in each kind of paraffin from 6—24 hours, according to size.

(f) Block as usual.

Xylol used for 1—2 minutes to remove paraffin *after* the sections have been fixed on clean slides with egg albumin does not seem to affect the myelin sheaths, owing in all probability to the short duration of the process. Having obtained satisfactory results with cedar oil I have not tried any other solvent, so cannot say how my stain may be influenced by the use of chloroform, acetone, etc.

Paraffin Sections should be left at least for 5 minutes in each solution when staining; it may even prove advisable to leave them for 15 minutes in the *mixture* (1) of chromic acid and bichromate of potash (kalium bichromate) mentioned below.

METHOD OF STAINING.

Celloidin sections are transferred from the 10 per cent alcohol (in which they are kept indefinitely) to ordinary tap-water, thoroughly washed and then stained for *two to five minutes* in each of the following solutions, care being taken to wash in tap-water between each solution in order to keep the chemicals as pure as possible.

(1) Stock solutions. 10% aqueous solution of chromic acid and saturated aqueous solution of kal. bichrom., (bichrom. of potash). Of these equal parts should be mixed. The mixture keeps almost indefinitely; its colour becomes darker (due to oxydizing) but its staining power increases with age; rich gold-

brown solutions are good, but *blackish brown* solutions have become useless.

(2) 10 per cent aqueous solution of liq. ferri perchloridi. I have not found this chemical to be changed by being exposed to the light, but have obtained satisfactory results with a solution used repeatedly and intentionally kept where the sun could shine on the white-glass bottle.

(3) Saturated aqueous solution of neutral acetate of copper: the standard solution is best made by pouring boiling water on the crystals and allowing to cool gradually—the muddy-green colour of the solution is changed to bright transparent blue by passing it through a filter. When cold it is then ready for use.

(4) Saturated alcoholic solution of haematoxylin. This too can be used almost indefinitely; the black flaky sediment which comes after use is simply removed by passing through a filter. It will be found that the staining-power of the haematoxylin is far greater when a "ripe" solution (red mahogany colour) is used, than when a fresh one (orange-pink or yellowish, according to the purity of the crystals themselves) has to be employed. Should only the latter be available, it will be found that adding a few drops of saturated aqueous solution of lithium carb., or a few crystals of permanganate of potassium, will greatly intensify its staining qualities. Rapidly oxidizing through this addition the solution will turn dark-red almost at once, but it will go on oxidizing and become useless in a couple of days. For this reason it is preferable to use the alcoholic haematoxylin "ripened" by exposure to the sun for about a fortnight.

(5) After washing, the sections are now put into a fresh portion of the saturated acetate of copper *until* dark blue clouds can be seen rising from them. Gradually the acetate changes its colour from bright clear blue to deep ultramarine; it then becomes useless and a fresh portion must be taken. (This is the only chemical which cannot be used repeatedly, but it is very cheap; a penny an ounce.) *Great care should be taken* that the acetate used is of good quality and pure. Impure, inferior crystals have on one occasion been known to spoil a whole batch of sections, causing the colours to fade and run.*

(6) Wash thoroughly.

(7) Differentiate as the Weigert stain.

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* I am having a chemical analysis made of the acetate used on that occasion and will publish the result as soon as possible.

In differentiating two sets of colour contrasts may be obtained:

(I) The exact replica of the original Weigert colours.

(II) A warmer colour scheme; connective tissue orange-brown; myelin sheaths deep "pansy"-blue.

In either case the red blood corpuscles, all nuclear structures and granules—which remain practically colourless with Weigert's method—are stained deep black, showing every detail. The Nissl granules on the contrary are dark brown.

Differential Solution for I—

Stock solution:

A. Saturated aq. sol. of Ferrocyanide of Potash (Ferrocyankali).

B. Saturated aq. sol. of Borax.

Equal portions of A. and B. are mixed and diluted with an equal quantity of tap-water. The mixture can be used a great many times, the brown flaky sediment, which comes after use, need not be filtered as it does not in any way interfere with the differentiating.

Differential Solution for II—

Stock solution:

A. Saturated aq. sol. of Ferricyanide of Potash (Ferri cyankali).

B. Saturated aq. sol. of Lithium carb.

Mix as for I (II will be found to differentiate slightly more rapidly than I). Sections that have been "overstained" by the haematoxylin may be started in II and finished in I; this will give a grey-brown tone to the connective tissue, but will save the nuclear structures from becoming discoloured by the more active ferri cyankali. Borax and lithium differ but little in their chemical qualities and may be interchanged.

(8) As soon as the sections are clearly differentiated, it is advisable to put them into *pure lithium* solution for a couple of minutes; the acid qualities of the iron cyanide of potash are thereby neutralized and the nuclear structures "fixed."

(9) Wash in running tap-water for 5—10 minutes; the longer the sections are washed the more brilliant blue they become.

(10) Dehydrate in absolute or 96 per cent alcohol. Clear in xylol (or "carbol xylol," containing some 20% of pure carbolic acid).

Mount in Canada balsam or xylol colophonium. Xylol colophonium is "safer" than Canada balsam as it contains no acid but I have found the so-called "acid free" C. balsam to give perfectly satisfactory results; specimens over three years old and mounted in this pure Canada balsam have not faded in the very least.

The "tap-water" which I used in my experiments has been the *slightly alkaline* water of Munich (Bavaria). Any water not giving satisfactory results from the beginning may be made alkaline by adding a few drops of the lithium carbonate solution (1 drop to 100 ccm.).

Both myelin sheaths and axiscylinders become clearly visible with the method (myelin sheaths blue, axiscylinders mostly brown)—I do not know of any other stain showing these details as clearly. It will also be seen that, whereas the "healthy" myelin sheaths stain *bright* blue, a "sick" fibre in the first stages of degeneration takes a purplish, reddish tint. This difference is most clearly noticeable in the fibres surrounding old apoplectic lesions.

A SIMPLE AND SELECTIVE METHOD FOR STAINING NEUROFIBRILS AND CYLINDERAXES.*

By Dr. Réné Sand, (Brussels).

1. *Fixation* of little pieces of tissue in the following mixture, which must be prepared at the moment to be used:

Acetone	90 cubic centimeters
Nitric acid	10 cubic centimeters

After an hour, and again 24 hours later, this mixture must be changed. The pieces of tissue are placed on filter-paper, and remain 48 hours in the fixator.

2. *Dehydration* in acetone, which must be changed 2 or 3 times. The dehydration is complete after 6 hours.

3. *Impregnation* with xylol during half an hour.

4. *Inclusion* in paraffin (two hours).

The sections (5 to 10) are fixed with Mayer's albumin and treated successively with xylol, acetone and distilled water.

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* Read at the meeting of the International Association of Medical Museums, London, August, 1913.

They are placed in a glass box containing a freshly prepared 20% solution of nitrate of silver in distilled water; they then remain three days in the stove at 37 degrees Centigrade.

Then, without washing, they are placed in a portion of the following mixture, which must be at least three days old,—

Acetate of soda	10 grams.
Gallic acid	5 grams.
Tannin	3 grams.
Distilled water	1000 c.c.

The solution becomes cloudy and must be changed.

After ten minutes in the above solution, washing and virage in,—

2% Solution of Ammonia sulphocyanure	17 c.c.
2% Solution of gold chlorid	3 c.c.
Distilled water	80 c.c.

(This solution serves several months.)

After five minutes in the above solution, washing, and passage through a 5% solution of soda hyposulphite, wash again, alcohol, xylol, Canada balsam.

The sections are uniformly stained; the neurofibrils and cylinderaxes are gray, when thin, and black when thick.

The selective staining is perfect.

From the same paraffin-block, sections may be colored by haematoxylin, Van Gieson, methylene or toluidin blue (for staining the Nissl bodies), orcein, Gram, etc.

ABSTRACT OF DEMONSTRATION ON THE STAINING OF CELLS AND AXIS CYLINDERS IN BRAIN MATERIAL FIXED IN BICHROMIC SALTS, AND ON LIESOGANG'S METHOD OF MOUNTING MICROSCOPIC SECTIONS IN GELATIN.*

By C. U. Ariens Kappers, Amsterdam.

I.—Staining of cells and axis-cylinders in brain material fixed in bichromic salts.

Dr. Ariens Kappers dealt with the difficulty of finding a good stain for nerve cells and axis cylinders in brain material that has been fixed in Müller's liquid or other bichromic salts.

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* Read at the meeting of the International Association of Medical Museums, London, August, 1913.

The necessity of looking for such a stain is obvious from the fact that nearly all the brains that have to be examined for purposes of pathological histology have to be fixed in Müller's fluid, to make them fit for the Weigert stain. If now we want to use some of the sections for a cell-stain the difficulty is directly shown.

For it is well known that Nissl's method gives poor results on such material.[1]

Better results can be obtained with carmine and paracarmine[2] but these results are by no means constant.

Till now the best cellstain for bichromic material is certainly Van Gieson's,[3] which is constantly used in the Institute for brain research in Amsterdam.

Speaker has been looking around for other methods and has tried the colours offered by nature in its flowers and berries.

Anthers of tulips, hyacinths and poppies, berries of the wood-berry, black-berry and elder-berry have been used for this purpose.

Referring for details to his publication on this subject[4] he gave the following résumé of the results:

Of the anthers of flowers alcoholic extracts (some KOH was added to the alcohol) were made. The stain obtained appeared to be a protoplasmatic stain for bichromic material. It was, however, not dark enough and consequently not suitable for differentiation.

Speaker mentioned the endeavours made by Fol,[5] Lovdowsky,[6] and Claudius[7] with these stains. These authors all mention that the stains which they obtained by alcoholic or aqueous extraction, were specially nuclear-stains. *Fol* emphasizes that chromic material is the least favorable for it, while *Lovdowsky* calls it the most favorable. Speaker's experience has taught him that chromic material is very fit for it and he differs from all these three authors in the statement that the stain, which he obtained by fermentation—not by extraction,—is an exquisite protoplasma-stain, as appears not only from the fact that in the preparations which he projected the ganglion-cells *in toto* stained but also from the obvious fact that axis-cylinders are better stained by this method than by any of the above mentioned, (carmine or Van Gieson). The stain is made in the following way:

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[1] This is even so if, as Van Valkenburg proposed, the chromic salts are first washed out, either by washing the section (which is insufficient) in permanganate of potassium and Lustgarten's liquid. In the last case the cell-stain with methylene-blue or one of its substitutes is a little but not very much better.

[2] See *Kappers* and *Keljen*: *Ueber Zellfärbung in Weigert-Pal Präparaten und eine Methode zum Studium der Verhältnisse zwischen weisser und grauer Substanz im Zentral-nerven-system.* Zeitschrift f. Wissenschaftliche Mikroscopie und Microsk. Technik. Bnd. 28, 1911, p. 245-278.

[3] "*Zellfärbung in Chromierten Material mittels Holänderbeerensaft.*" Zeitschrift f. Wissenschaftliche Mikroskopie, Bnd. 28, 1911, u. 417-424.

[4] Lehrbuch der Vergleich Mikrosk. Anat. 1896, p. 183.

[5] Archiv. f .Mikrosk. Anat. Bnd. 23, 1884, p. 506.

[6] Centralblatt f. Bacter. Abteil. 2, Bnd. V, 1899.

Dark elder-berries, the stems being removed, are squeezed with the hands as much as possible to break their skins. This mass is put on the paraffin stove (not in it). It there has a temperature of about 20 to 21° C. This temperature rises the next day already to about 25° C to 26° C, as a consequence of spontaneous fermentation. After four days the fermentation goes down again to 21 C. The jar then contains a great quantity of coloured juice, which has lost the slimy viscosity of fresh juice, and can be be easily filtrated. This is boiled for 20 minutes to make albuminoids precipitate, and to remove some of the acid. The rest of the acid is removed by adding carbonate of calcium. A great quantity of carbonic acid is then evaporated and the acetic acid is attached to the calcium and removed by filtration. The remaining liquid is now very dark; and kept a year with ½% of carbolic acid added for preservation.

The sections (celloidin or paraffin) are stained at night, then they are washed in water and differentiated in 3% liquor ferri-sesqui-chlorati, washed again, and after having passed through alcohol and xylol mounted in Canada balsam. It then appears that the ganglion cells are nearly black, the intermediate substance of the horns greyish and the axis cylinders dark black.

The preparations keep well, and do not fade. Paraffin sections are to be preferred because the cellodin takes also the stain.

II.—Liesogang's method of Mounting Microscopic Sections in Gelatin.

After this *Dr. Kappers* demonstrated some sections through entire brains, 30 microns, coloured after *Weigert-Pal* and included in gelatin after *Nieuwenhuyse's*[7] modification of Liesogang's[8] method. Speaker told that Dr. Nieuwenhuyse, the pathologist of the Asylum "Meerenberg" near Amsterdam, had modified Liesogang's method in the following way:

100 gr. pure gelatin are put in 300 c.c. cold water. After being swollen (which happens in some hours) its temperature is raised to 50° C, and then it is filtrated through the common filter-paper. This substance becomes solid again in the air and is used at a temperature of 37° C, being then liquid. The sections, on little sheets of paper, are put in this liquid gelatin in cuvette for about 20 minutes.

The slides are in the meanwhile carefully cleaned and flamed. After this some gelatin is spread out on them, which remains liquid on account of the glass being heated a little. Directly after the preparations are taken from the cuvette and spread out in the gelatin on the glass.

One has to be very careful that no air-bubbles remain under the sections. Small air-bubbles are generally absorbed in Canada-balsam, but they remain in gelatin and may have a bad influence upon the fixation of the section to the glass, while they also give optical difficulties. It is not necessary to be specially careful to stretch the sections, because the solidification of the gelatin has this effect. The sections being put on the glass, new gelatin is carefully put on this to cover the section. For a glass of 9 x 12 cm. about 20 cc., No. 3 gelatin is necessary. This can be best done by a glass tube. As soon as the gelatin falls on the section it may be spread out by a glass stick.

When the cold of the air has solidified the gelatin, the preparation is put for half an hour in 10% formalin, in which it becomes insoluble. The preparations are now still opaque and not entirely stretched. They only become transparent when being dried above the paraffin stove or in a specially constructed stove (with ventilation) in which the temperature does not exceed 30° C. Then they also lose their wrinkles and the thick layer of wet gelatin is transformed into a thin lamella, which has the same transparency as Canada balsam, and on which also oil immersion can be applied.

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[7] Nieuwenhuyse: *Die Conservierung Mikroskopischer Praeparate in Trockener Gelatine.* Folia Neurobiologica. Bnd. VI, 1912, u. 608-614.

[8] Liesogang: Zeitschrift für Wissenschaftliche Mikroskopie. Bnd. 27, p. 369.

This method of mounting sections has several advantages:

1st. The mounting takes place directly after the sections are washed in water, consequently no alcohol, no xylol is used.

2nd. Gelatin is cheaper than Canada balsam.

3rd. No covering is used.

4th. The slides with the sections, after being entirely dried can be kept by being piled upon each other with a piece of paper between, (they are not sticky).

5th. They can be used as photographic negatives.

6th. They have fewer wrinkles than Canada balsam sections.

7th. The gelatin does not melt in hot countries, so that for southern countries this way of mounting can be specially recommended.

The method however cannot be used for all stainings. It is very suitable for myelin-sheaths preparations (Weigert and Weigert-Pal, equally for Luden's method) (at least for Bielchowsky's) or Heidenhain's iron-haematoxylin stain. It is however not fit for stains that dissolve in water, because these also dissolve in the gelatin solution. Consequently it can not be used when the sections are stained with carmine, methylene blue and such.

Dr. *Nieuwenhuyse* has sections thus included, 20 months old. They have not changed, and the Institute for Brain Research in Amsterdam has a large collection of sections (many hundreds). They keep very well, so that *Liesogang's* method with the modifications of *Nieuwenhuyse* is introduced there in daily routine. General sections through both hemispheres thus mounted were shown and distributed.

III.—Method of Mounting Microscopic Sections of Brains in Gelatin.

After this the speaker showed still some microscopic brain sections included in a mixture of gelatin-glycerin and water. He dealt briefly with *Mankowsky's* method of penetrating entire brains,[9] with such a mixture and then hardening it in alcohol which has the advantage of keeping loose parts together. If, however, the alcohol is omitted the colour of brain sections that are fixed in Kaiserling's liquid, remains fresher. Thus he showed microscopic sections through an elephant's brain, three years old, which looked as if the sections were made the day before. The gelatin mixture used for this purpose is: 60 c.c. aq. dest.; 30 c.c. glycerin; 6 gms. gelatin. To this is added 0.09 gms. acid arsenicosum to prevent bacteria growing on it. The warm mixture, when the section is enclosed in it, solidifies by itself, and is covered with glass, and then surrounded by a mixture of colophonium and cera flava equal parts. This method introduced by Dr. Ernst de Vries in our Institute is frequently used and gives good results.

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[9] Centralblatt f. Allgemeine Pathologie und Path. Anat. Bnd. 17. 1906, p. 467.

A METHOD FOR MAKING PERMANENT MOUNTS OF CULTURES OF BACTERIA.*

By J. H. Hewitt, M.D.

(From the Pathological Laboratory of the Cleveland City Hospital, Cleveland, Ohio.)

The method consists essentially in mounting cultures of bacteria between glass plates, held apart by aluminum metal frames.

In the process there are the following steps:

1. Preparation of the plates and frames.
2. Planting the bacteria.
3. Sealing the mount.

PREPARATION OF THE PLATES.

Two glass plates 4 x 5 inches in size and an aluminum frame 3½ x 4½ x ¼ inch, the frame between the glass plates, are wrapped in paper and sterilized by dry heat. These bundles of two glass plates and a metal frame may be sterilized and stored for future use or they may be used immediately The frame is next removed from the paper wrapping and dropped into a pan of hot paraffin. After it has remained a few moments it is removed with a pair of tongs that grasp the frame on either side and is placed on one of the glass plates, (see Fig. 1). The paraffin on congealing cements the frame to the glass plate and we have a cell constructed similar to those I have described[1] for mounting thin specimens in gelatin.

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* Read at the meeting of the International Association of Medical Museums, Toronto, April 9th, 1914.

[1] Hewitt: Bulletin No. 4, The International Association of Medical Museums.

PLANTING THE BACTERIA.

Where individual colonies are desired, dilute suspensions of the organism in liquid agar or gelatin are poured into these cells, in the same manner that plates are poured for the isolation of colonies of bacteria. The top is covered immediately with the second glass plate cover and the medium allowed to congeal. It is then incubated for the desired period.

For stroke cultures the agar or gelatin is poured into the cells, covered, and allowed to congeal. Strokes of the organism are then made on the surface and the culture incubated.

Extraneous moulds and contaminating bacteria that may fall in from the air may be removed by cutting around them and lifting them with a certain amount of the surrounding medium from the surface of the glass plate. The space is filled in with fresh medium and allowed to congeal before the mount is sealed.

When the growth of the desired character is obtained, it is stopped and the culture killed with the fumes of formaldehyde gas. This is accomplished by removing the top glass plate and placing the culture beneath a large bell jar together with about thirty grams of potassium permanganate mixed in a tall cylindrical graduate with 60 to 75 centimeters of commercial formol, The purpose of the tall graduate is to prevent the surface of medium becoming spotted by the effervescing and boiling potassium and formalin mixtures. For gelatin cultures this method of fumigation has the further advantage of setting the gelatin and preventing it from melting. Of course only those organisms which do not liquify gelatin can be preserved on gelatin. Growths on other solid media, Dorset's egg media, blood serum, potato, etc., can be preserved by making the cultures in Petri dishes, cutting the media into rectangular pieces to fit the frames, and cementing them into the frames with agar or gelatin. (Preferably gelatin, as it sets when exposed to the vapor of formaldehyde).

SEALING THE MOUNT.

This is performed after the culture has been fumigated, by painting the top of the metal frame with a layer of melted paraffin. The top glass then is heated and pressed firmly into position. The whole object is then placed in a tin pan, a weight placed on the top plate, and the pan filled with hot melted paraffin till the top plate is covered to the depth of 1 to 2 milli-

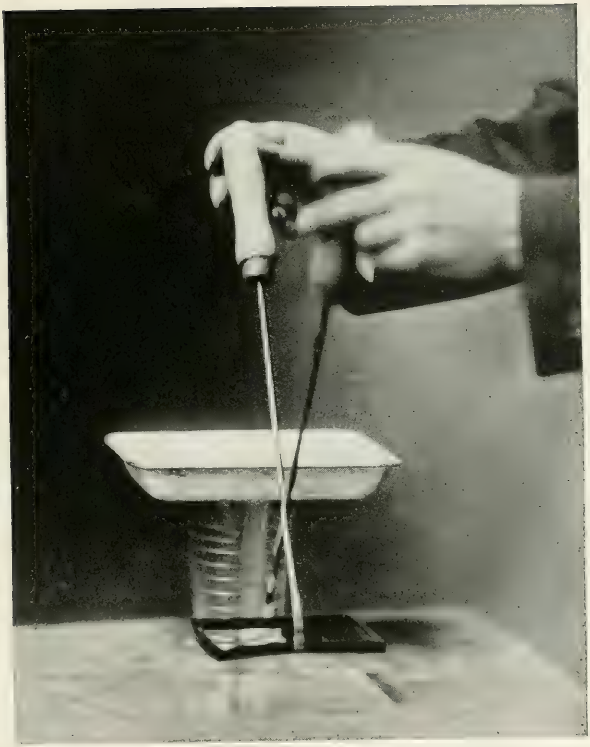

Fig. 1.—The Method of Preparing the Cells into which the Bacteria are to be Plated or Planted. The Pan Contains Melted Paraffin. The Frame and Glass Plate have been Sterilized by Dry Heat. The Paraffin that Collects on the Frame After it is Dipped into the Pan is Sufficient to Seal the Frame to the Plate

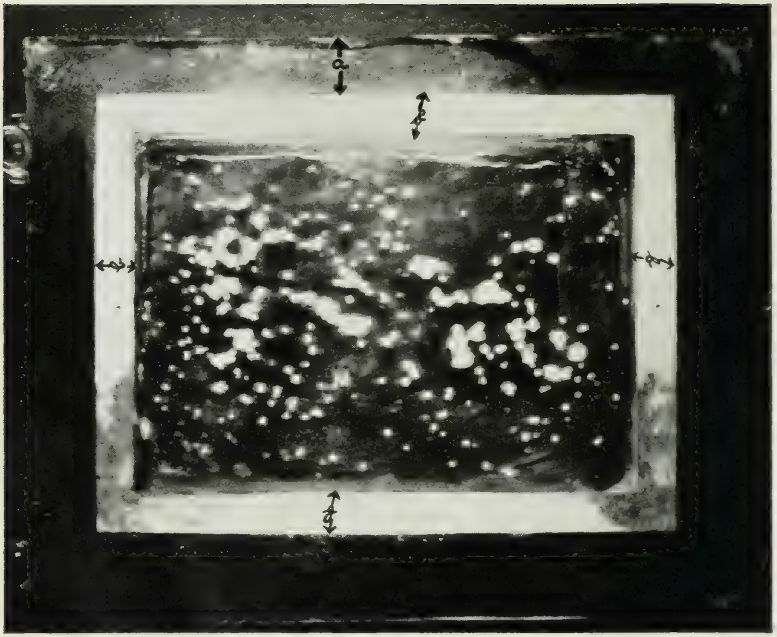

Fig. 2.—The Appearance of the Mount After the Agar-Agar has been Removed and the Margin (*a*) Filled with Paraffin. The Metal Frame is seen at (*b*) and Individual and Fused Colonies of Bacteria are to be seen on the Surface of the Medium Inside the Frame.

meters. The remainder of the process is identical with that already[2] described for sealing specimens mounted in agar-agar (see Fig. 2).

SINGLE BACTERIAL COLONIES IN SEALED PETRI DISHES AS MUSEUM PREPARATIONS.*

By A. Arthman Bruére.

Clinical Laboratory, Royal Victoria Hospital, Montreal.

This exhibit consists of single colonies of Fungi (*Tricophyton megalosporon and Microsporon Audonii*) in maltose agar plate-cultures, prepared by the following method:

Remove scales or suspicious hairs from the skin or scalp lesions, place them in a sterilized Petri-dish and cover with ether; in from four to five minutes drain off the ether and plant the hairs or scales on acid beer-wort agar containing 1% added maltose. If the cultures resulting be not pure, transfers may be made of the growing fungi to fresh beer-wort agar with a reaction to phenolphthalein of + 2%. Let the colonies grow to a suitable size, and then stop their growth by inverting the Petri-dish, and placing a piece of blotting paper saturated with formalin on the inside of its cover, and replace the dish itself over this. The formalin kills the growth. It is allowed to act for six to twelve hours, after which the blotting paper is removed and the Petri-dish is sealed with paraffin by pouring this between the margins of the dish and its cover.

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[2] Hewitt: Bulletin No. 5, The International Association of Medical Museums.

* Read at the meeting of the International Association of Medical Museums, London, August, 1913.

MUSEUM RESEARCH

Cardiac Anomalies

TWO RARE CARDIAC MALFORMATIONS:

(1) *Congenital Aneurismal Dilatation of the Ductus Arteriosus;*
(2) *True Partial Transposition of the Great Vessels with Both Aorta and Pulmonary Artery Arising from the Right Ventricle.*

By Carl Vernon Weller, A.B., M.D.,
Instructor in Pathology, University of Michigan.

1. *Congenital Aneurismal Dilatation of the Ductus Arteriosus.*

In Dr. Abbott's[1] analysis of 631 cases of congenital cardiac disease there occurs a small group of thirteen cases in which the ductus arteriosus was found to be dilated to such a degree that the condition was described as an aneurism or an aneurismal dilatation. The present case falls into this group but differs from most of the others in that there was no evidence of thrombosis of the dilated ductus.

The patient, a male infant 5 days old, was born in the Maternity Ward of the University Hospital, (service of Dr. Peterson). The delivery was normal and the baby appeared to be in excellent condition, crying spontaneously. There was no cyanosis worthy of note. On the third day the child has a temperature of 102° and on the fourth day there was blood in stools and vomitus and hemorrhages from mouth and navel. These were repeated on the fifth day, on which the infant died. The Wasserman was negative on both mother and child and no history of haemophilia could be obtained, but the mother had only one living male relative.

Aside from the condition of the heart the autopsy findings were quite negative except for multiple sub-serous hemorrhages and a marked passive congestion.

The heart itself measured 4.5 by 3.5 by 2.8 cm. Both ventricles were firmly contracted. The wall of the left ventricle

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[1] Abbott. Osler-McCrae, Modern Medicine, Vol. iv, p. 341.

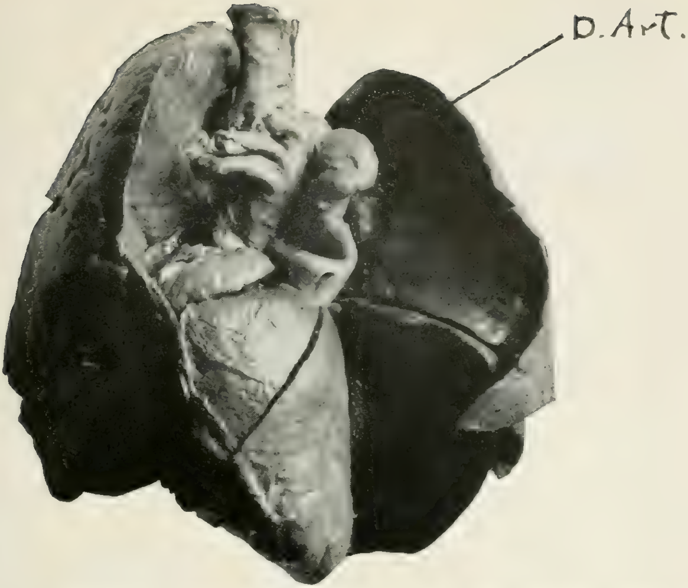


Fig. 1.—Congenital Aneurismal Dilation of the Ductus Arteriosus. *D. Art.*—the Ductus Arteriosus Bulging Anteriorly and to the Left of the Arch of the Aorta.

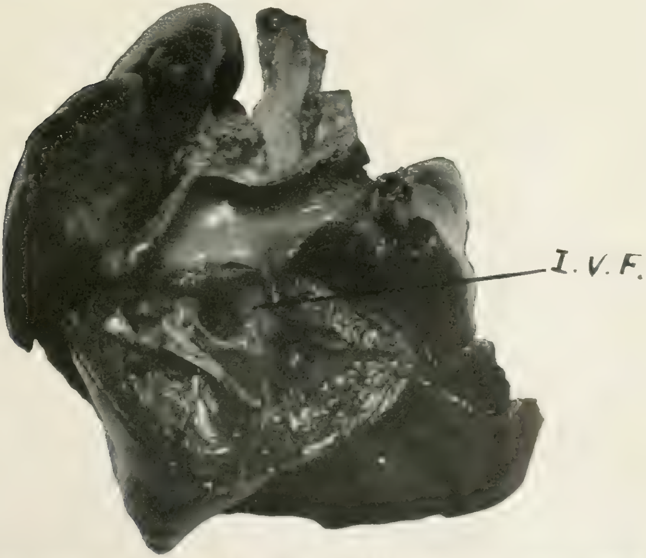


Fig. 2. Transposition of the Great Vessels with Both Aorta and Pulmonary Artery Arising from the Right Ventricle. *I. V. F.*—the Foramen in the Interventricular Septum.

averaged 5 mm. in thickness; the right, 7 mm. The inter-ventricular septum was complete and there were no anomalies of the valve cusps. The foramen ovale was patent to but the normal degree for the age of the subject, admitting a 3 mm. probe. The aorta measured 5 mm. in diameter 1 cm. above the valve, while the diffusely dilated pulmonary artery measured 12 mm. in diameter at the same level.

Lying above the heart and bulging anteriorly between the aorta and the pulmonary artery there was found a rounded mass the size of a cherry. This proved to be the patent and greatly dilated ductus Botalli which retained its rounded contour somewhat in spite of the fact that it was practically empty. The total length of the ductus was about 3 cm. and it was thrown into a tortuous course best described as a reversed letter "S." The first portion of the curve, near the aorta and convex anteriorly and to the left, formed the bulging tumor first noted. Here the lumen of the empty ductus was 1 cm. in diameter. The second portion of the ductus, concave anteriorly and near its junction with the pulmonary artery, was much more narrow and had a lumen 6 mm. in diameter.

No other anomalies were found either in the viscera or elsewhere in the body.

The specimen may be classified as one of aneurismal dilatation of the ductus arteriosus, unassociated with other anomalies except a diffuse dilatation of the pulmonary artery.

2. *True Partial Transposition of the Great Vessels with Both Aorta and Pulmonary Artery Arising from the Right Ventricle.*

The second heart is that of a male infant, four weeks old, who was a patient in the Department of Paediatrics of the University Hospital (service of Dr. Cowie). The child had not been cyanotic but a diagnosis of congenital cardiac disease had been made, based upon auscultatory findings.

Death followed operation for cleft palate and at autopsy in addition to the various anomalies present there was found to be an acute purulent meningitis, an acute purulent pyelitis and metastatic abscesses in lung and kidney. Body length was 45 cm., weight, 2120 gms.

A striking feature of the case was the number and variety of malformations and defects present. There was a complete double cheilopalatoschisis, and a sacro-coccygeal dimple, well-marked, with a hairy border. There was cryptorchismus and the penis was diminutive in size. The pinnae of both ears were unusually wide. The fore-fingers of each hand lacked the terminal phalanx and there was no nail formation upon these fingers. The nail of the great toe of the right foot was but rudimentary. Anomalies were found also in examining the viscera. The right lung was divided into but two lobes and there were two accessory spleens, while the heart presented the interesting condition which makes it the subject of this report.

The heart measures 3.5 by 3 by 2 cm. There is a single apex formed equally by both ventricles.

The left ventricular wall measures 3-5 mm, in thickness and this cavity communicates with the left auricle through an orifice which is guarded by a large anterior and a small posterior cusp. From this ventricle there is no exit by an arterial trunk but it communicates with the right ventricle through a defect in the inter-ventricular septum 5 mm. in diameter. This defect is situated in the base of the septum in such a position that it is partially covered by the large anterior cusp of the mitral valve. The left auricle receives the pulmonary veins.

The right ventricular wall measures 5-7 mm. in thickness. From this ventricle two arterial trunks are given off. The larger of these, which lies to the right, is the aorta. It gives off the great vessels from the arch in normal order. The opened aorta has a circumference of 21 mms. The aortic valve consists of two well-marked cusps and the larger of these shows an imperfect sub-division. Considered as three cusps the right anterior cusp is the non-coronary one.

Also from this ventricle and to the left and slightly posterior to the aortic valve a pulmonary artery is given off. This is much smaller than the aorta and measures 13 mm. in circumference. Although arising to the left of the aorta, the pulmonary artery passes spirally behind it so that the bifurcation of the pulmonary is almost directly behind the aorta. The pulmonary valve is bicuspid.

The ductus Botalli is patent, admitting a 2 mm. probe. The foramen ovale is also quite widely open, measuring 7 mm. across.

The right auricle receives the venae cavae. It is guarded by a bicuspid valve, the cusps of which are irregular in size. The right auricular appendage is given off to the right of the auricle.

Because of the multiple anomalies, the classification of this heart is a matter of some difficulty. It shows a transposition of the great vessels amounting to somewhat less than a 180° rotation. This transposition is but imperfectly corrected by the interventricular septum so that both arterial trunks are given off from the right ventricle. This anomalous arrangement of the great vessels is associated with a defect in the inter-ventricular septum, with an open foramen ovale and with a patent ductus arteriosus.

CONGENITAL PULMONARY ATRESIA WITH PERFORATE INTERVENTRICULAR SEPTUM IN A PATIENT AGED 9 YEARS AND 6 WEEKS.

By S. B. Wolbach and Maude E. Abbott.

This case of complete congenital atresia of the pulmonary valve with perforate interventricular septum is of interest because of the age attained by the patient which was nine years and six weeks. The *clinical history* presents no remarkable features. Birth occurred in the eighth month of pregnancy and the infant weighed three pounds. Cyanosis at the age of four years was noted by the mother. The child was studied repeatedly for long periods at the Children's Hospital in Boston between the ages of four years and time of death. During this time the features were those of pulmonary stenosis. There was at all times marked cyanosis, clubbing of the fingers and toes and marked polycythaemia. The heart was markedly enlarged, at times incompetent and there was considerable bulging of the chest wall over the region of the heart. The data revealed by auscultation were consistent with the diagnosis of "pulmonary stenosis." The usual findings were fairly regular though rapid heart action with a much accentuated second sound in the pulmonary artery region. At times a systolic murmur was heard. During the later months of life acute endocarditis developed. Death occurred suddenly in the Hospital, unobserved.

The following is the report of the autopsy which was performed in the Pathological Laboratory, Children's Hospital, Boston, under serial No. A-15-3, Medical Service No. 3329, on Friday, February 10th, 1915, by Dr. S. B. Wolbach. Examination was restricted to the heart.

Gross Anatomical Diagnosis:

Complete congenital atresia of pulmonary artery; Congenital defect of interventricular septum; Aorta from both ventricles;

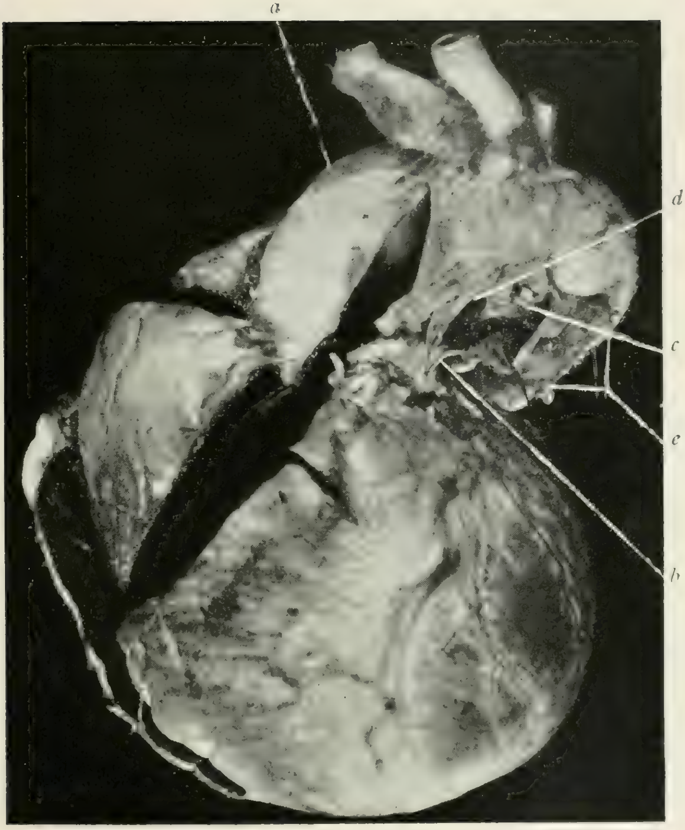
Persistent ductus arteriosus; Acute vegetative endocarditis; Thrombosis of ductus arteriosus; Patent foramen ovale; Dilatation and hypertrophy of right ventricle with tricuspid insufficiency.

Description of Heart:

The heart is greatly enlarged and weighs 130 grams. The general shape is that of the normal heart, but the right border is rounded and it is evident that the right ventricle is enlarged. The auricles are in their normal position, the appendage of the left auricle, however, is narrow and projects as a curved process 2.5 cm. long and 0.5 cm. broad.

There is but a single arterial trunk which arises at the base of ventricles, anterior to the auricles. The tips of the right and left auricular appendages appear in their respective sides of this vessel. On opening the heart it is found that this vessel arises from both ventricles, its orifice is directly above the interventricular septum which is deficient. This deficiency corresponds to that resulting from the absence of the membranous portion of the septum, its upper border is the attachment of the anterior segment of the mitral valve; its right pillar extends to the base of the right anterior segment of the semilunar valve of the arterial trunk while its left pillar extends to the junction of the left anterior and posterior segment of the valve. The size of the interventricular opening is 2 x 1 cm. (after hardening). The arterial trunk is apparently effectively guarded by these semilunar valves, a posterior and a right and left anterior. The free edges of these segments are slightly thickened and covered with pale, grayish friable granulations.

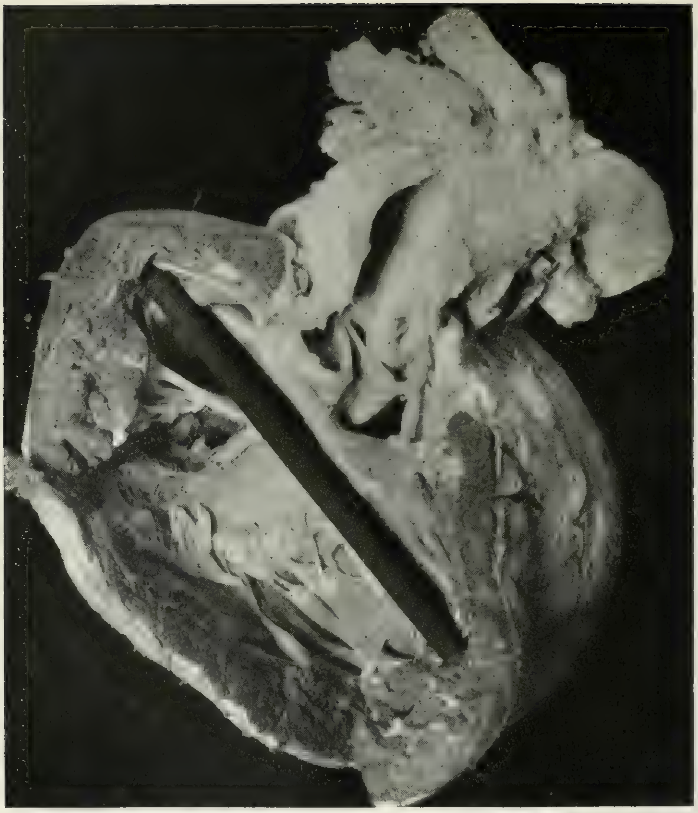
The coronary arteries take origin behind the posterior and the left anterior segments. The size and shapes of the segments are those of a normal aorta in a heart of this size. The circumference is 8 cm. The arch corresponds to the arch of the aorta and is continuous with the descending aorta. The vessels given off are in order named: the innominate, left common carotid, a small thin walled ascending vessel and the left sub-clavian. At the location of the ductus arteriosus a large vessel takes origin, by a short trunk which divides into a right and left pulmonary artery. From this trunk, running down along the main arterial trunk is a thin walled, small calibred vessel 2 to 3 mm. in diameter. This vessel ends blindly, gradually tapering to a point in



CONGENITAL PULMONARY ATRESIA WITH PERFORATE INTERVENTRICULAR SEPTUM, IN A CHILD AGED NINE YEARS.

FIG. 1.—*a*. THE LARGE AORTA ARISING CHIEFLY FROM THE RIGHT VENTRICLE, *b*. RUDIMENTARY PULMONARY ARTERY ATRESIC AT ITS ORIFICE, *c*. THE PATENT DUCTUS ARTERIOSUS WITH THROMBUS, *d* RIGHT PULMONARY ARTERY, *e*. LEFT PULMONARY ARTERY.

Reduced one-half. Dr. Wolbach's Case



Congenital Pulmonary Atresia with Perforate Interventricular Septum, in a Child aged Nine Years.

Fig. 2. The Left Ventricle Laid Open to Show the Aorta Riding Above the Large Defect at the Base of the Interventricular Septum, and Arising Chiefly from the Right Ventricle.

the myocardium between the posterior and left anterior segment of the valves of the main arterial trunk.

The orifice of the pulmonary trunk into the arch of the main trunk is 0.4 cm. in diameter and nearly wholly occluded by a firm grayish red clot. This clot is cylindrical in shape, 0.4 cm. long and attached firmly over one half its circumference (organized).

The mitral and tricuspid valves are normal in appearance. The mitral measures 8.5 cm. in circumference at the attachments of the segments and the tricuspid valve measures 10 cm.

The venous orifices in the auricles are normal in number and position. The foramen ovale is patent by an oblique passage.

The endocardium is normal except for the vegetations noted on the aortic valves and a few minute vegetations on the inferior border of the opening between the two ventricles.

The myocardium is firm, of normal color and consistency. The left ventricular wall averages 1 cm. in thickness, the right 0.9. cm.

Remarks:

As has been said the interest of this case consists chiefly in the high age attained by the patient, and the fact that in spite of the unfavorable conditions present, cyanosis was not marked until after the fourth year, from which period a high degree of polycythaemia was also noted. The combination of a defect in the interventricular septum and a widely patent ductus arteriosus may supply an explanation.

Pulmonary atresia presents one of the most serious forms of congenital cardiac disease, for the complete obstruction presented to the passage of the blood from the right ventricle to the lungs implies the most extreme degree of deficient aeration possible. The duration of life is thus of course short. This is especially true of the cases with patent foramen ovale and *closed* interventricular septum which all die in early infancy and which present during life the most extreme picture of congenital cyanosis from birth, the *morbus caeruleus* of the old writers. In those cases in which the pulmonary atresia is associated with a defect of the interventricular septum at the base and a deviation to the right of the aorta so that this vessel comes to ride over both ventricles above the defect (as in the present specimen), the conditions are slightly better, and here accordingly the duration of life is considerably longer. The oldest case in the literature is one of this type recorded by Peacock, of a girl with marked cyanosis, who died at the age of 13. Here the pulmonary artery ended in an impervious funnel-shaped diaphragm formed by a fusion of the pulmonary valves, and the conus was a small canal with thin walls forming a distinct separate cavity cut off from the remainder of the right ventricle. There was a large defect of the interventricular septum at the base, above which the aorta arose almost wholly from the right ventricle. The foramen ovale was closed. The ductus arteriosus was destroyed, but had probably been pervious, for a loud continuous murmur preceded and accompanied and followed the heart sounds over the whole front of the chest throughout the cardiac cycle. It is possible that here, as well as in our own case, a widely patent ductus carried the blood transmitted from the right ventricle through the septal defect into the aorta to the lungs, and thus presented conditions sufficiently favorable to the pulmonary circulation to admit of the relatively high age of 13 years being attained.

In twenty-five cases, including our own, in the literature, in six the interventricular septum was closed, and the foramen ovale was patent. In all but two of these the ductus arteriosus was also widely patent. All six were cases of extreme morbus caeruleus, and the age at death varied from three days to six months. In the remaining nineteen cases, the interventricular septum was defective; in seven of these the foramen ovale was closed, and in eleven it was also patent. The duration of life in these nineteen cases varied from thirteen days to thirteen years. In fourteen of the cases it was below five years, and in the remaining five the patients lived to the ages of six, seven, nine, eleven, and thirteen years.

The following summary of these five cases is of interest:

I. *Weiss* (Deut. Arch. f. klin. Med. 1875, XVI, p. 379) reports a boy of *six* with marked cyanosis and clubbing, pigeon-breast, pulmonary accentuation, but no cardiac murmurs, who died suddenly. The pulmonary artery was the size of a small pencil, and the conus was very tiny admitting a pin-head only, its endocardium was thickened and the pulmonary valve was bicuspid. The foramen ovale was patent and the interventricular septum presented a large defect at the base above which the aorta arose chiefly from the right ventricle. The ductus arteriosus was finely patent. A large anomalous branch rose from the thoracic aorta near the diaphragm and passed by a coarse anastomosis to the left lung.

II. *Moore* (Trans. Path. Soc. Lon. 1889, XLI, p. 55) records a girl aged *seven*, in whom the pulmonary artery was very small and opened out of the right ventricle through a mass of thick dense tissue which obliterated the conus. There was a large defect at the base but the foramen ovale and the ductus arteriosus were both closed.

III. *Wolbach and Abbott* (this article). From a patient aged *nine* years and *six* weeks who died suddenly. Marked cyanosis and clubbing developed at the age of four. Atresia of the pulmonary orifice, stenosis of the pulmonary conus, defect of the interventricular septum at the base, deviation to the right of the aorta, patent ductus arteriosus and closed foramen ovale.

IV. *Whipham* (Soc. Roy Med., 1910. Sec. Dis. Ch., Oct. 28, '10). A child aged *eleven* with great polycythaemia, cyanosis and clubbing, who died suddenly. The ductus arteriosus was obliterated, the foramen ovale patent, the interventricular septum defective, and the pulmonary valves were welded together so as to leave only a minute pin-hole orifice and the pulmonary artery was small.

V. *Peacock* (Trans. Path. Soc. XX, p. 61). (Cited above). The patient was a girl of *thirteen*.

TWO CASES OF WIDELY PATENT FORAMEN OVALE.

By Maude E. Abbott, M.D.,
McGill University, Montreal.

A slitlike or valvular patency of the foramen ovale, sometimes large enough to admit a lead pencil, is recognized by all those with autopsy experience as a very common phenomenon, occurring according to combined statistics in some 30 per cent of all cases. In most of these the opening does not gape, but is closed by the pressure of the overlapping edges of the valvula foraminis ovalis in the left auricle and the annulus ovalis in the right. Such cases cannot be regarded as an anomaly, both because of their frequency, and because, under ordinary conditions, they present no disturbances in the circulation. A widely gaping foramen, in which an opening remains permanently between the free borders of the annulus ovalis and the valvula foraminis ovalis, which cannot be approximated, permitting the free passage of blood from one auricle to the other, without the interposition of any valvular fold, is not usual in cases uncomplicated with other anomalies and must be ranked among cardiac defects, as presenting a permanent interauricular communication.

Like other defects of the interauricular septum the majority of these cases are characterized by an entire absence of cyanosis except as a terminal phenomenon, (*cyanose tardive* of the French writers) and by the presence of the characteristic physical signs in the form of precordial bulging and a rough presystolic or systolic murmur and thrill with maximum intensity in the neighbourhood of the 3rd left interspace. Marked pallor and a general gracility of form is not uncommon, for the reason that such wide patency is frequently associated with hypoplasia of the aorta, whether as a primary or secondary condition is not altogether clear.

This combination presents a definite symptom-complex which frequently enables a correct clinical diagnosis to be made.

The two cases presented here of uncomplicated patency are of interest, first because they presented during life this definite clinical picture to be ascribed to a patent foramen of the widely gaping type, (which enabled the diagnosis to be made antemortem in the first case) and secondly, because they form an interesting comparative study of the effects upon the hearts of such cases of an associated mitral stenosis, which was present in the second of these cases, but not in the first, and which led to the most extensive degree of back pressure in the right auricle, evidenced by extreme dilatation of its wall, aneurismal dilatation of the coronary sinus and its tributaries, and an indirect communication of the latter with the cavity of the left auricle through an opening supplied with a subsidiary valve. This second case was further remarkable in that there was associated with it an anomalous fenestration of the annulus ovalis and of the Thebesian valves, probably due to a faulty involution of the embryonic valvula venosa sinistra, to which also persistent patency of the foramen ovale has been ascribed by several authorities. Both cases showed also a coarctation of the aorta.

My thanks are due to Dr. C. F. Martin, in whose public service these patients were, for the privilege of observing these two cases during life, and for permission to report them here.

Case I.

Large Patent Foramen Ovale with Cribriform Fossa Ovalis, Hypoplasia of the Aorta, and Stenosis at the Isthmus. Simple Hypertrophy of the Left Ventricle. Hypertrophy and Dilata-

tion of both Auricles.. Hypoplasia of external genitals. Diagnosis made before death on the ground of pallor, absence of cyanosis, and presence of characteristic physical signs of Auricular Septal Defect, and of Hypoplasia of the Aorta.

Clinical History: L. L., female Russian Jewess, aged 26. Admitted to R. V. H., March 16th, 1914, complaining of trouble in vision, frequent headaches, swelling of the legs and face, shortness of breath on exertion, morning vomiting, irregular menstruation, palpitation and pain over the heart. These symptoms had persisted one year. She was unmarried, and had been in Canada for two years, gave no history of any previous illness, scarlet fever or rheumatism. Menstruation had commenced at thirteen and was regular every five to six weeks; amenorrhoea had been present nine months. The family history was negative.

On admission showed no signs of cardiac embarrassment, no dyspnoea, cyanosis nor clubbing. The pulse was 114, regular and small, and the blood pressure rather high, 170.

Examination of the heart and great vessels: Inspection showed some precordial bulging, and marked throbbing involving most of the front of the chest, the neck veins very much congested, but no positive venous pulse, epigastric pulsation, and the apex beat in the fifth left interspace in the anterior axillary line, the veins over the front of the chest slightly dilated. On palpation a marked systolic thrill was felt at the base of the left sternal line and to the left of this down nearly to the fourth left rib or third left interspace. There was no diastolic shock, but tracheal tugging was present. The cardiac dulness began above at the second rib and extended laterally from 4 cm. to the right and 11.5 cm. to the left of the median line at the fourth rib and 13.5 cm. to the left at the fifth rib. On auscultation a loud harsh systolic murmur having its maximum intensity at the third left cartilage 4.5 to 5 cm. from the mid-sternum, was heard all over the front of the chest and in the left back. At the apex there was a suggestion of a presystolic murmur and a systolic blow was audible at the pulmonary cartilage.

Urine showed a sp.g. of 1010, alkaline reaction, a few hyaline and granular casts.

On April 15th, 1914, a pericardial friction rub developed, also ptosis of right upper lid and definite external squint. Examination of the blood haemoglobin 45 percent, red blood corpuscles, 3,500,000. Died suddenly on April 16th, 1914.

Autopsy showed the conditions enumerated above, also an acute fibrinous pericarditis and pleurisy, cloudy swelling of the liver, fibrotic cardiac spleen, atheroma of the aorta, anasarca, chronic interstitial nephritis, both kidneys very small, weighing together 55 gms. (? congenital hypoplasia). The brain was not examined.

Examination of the heart showed a moderately enlarged organ covered by an extensive exudate of recent fibrin. Both auricles were dilated to about double their capacity and their musculature especially that of the right was considerably increased. The auricular septum presented a gaping hole admitting the thumb which was bounded above and anteriorly by the thick annulus ovalis, and below and behind by the thin crescentic margin of the valvula foraminis ovalis, which was considerably enlarged and bulged into the right auricle and presented numerous fenestrations, as well as a hole admitting a bone knitting needle at its upper border. The Eustachian and Thebesian valves were normal as well as the auricular walls elsewhere and the tricuspid and mitral orifices. The right ventricle was about normal size being the only chamber of the heart unaltered. The pulmonary orifice was moderately dilated, measuring 6 cm. as also the pulmonary artery which was thin walled and otherwise normal. The obliterated ductus was plainly seen as a small ligament about .25 cm. long and extending from the base of a depression at the bifurcation of the aorta just beyond the subclavian where its insertion was marked by deep puckering and by a patch of atheroma. The left ventricle was markedly hypertrophied, its wall measuring 18 cm. in thickness, but was only slightly dilated, a simply hypertrophy existing. The aortic orifice was very narrow measuring 4.5 cm. in circumference. The aorta itself widened slightly at its origin, but was abruptly narrowed at the point of insertion to the left subclavian artery to a circumference of 3 cm., widening shortly below this to 4 cm. Several patches of atheroma were scattered over the arch and thoracic aorta.

CASE II.

Large Patent Foramen Ovale with Calcified lower Border, Fenestrated Annulus Ovalis and Anomalous Septum in right Auricle, Anomalous Pocket on Wall of Left Auricle, Aneurismal Dilatation of Coronary Sinus and of Right Auricle, Dilatation of the Pulmonary Artery. Slight Hypoplasia and Coarctation of the Aorta.

Clinical History. Mrs. B., aged 38. Admitted to R. V. H. in August, 1912, in an advanced state of failing compensation, marked ascites, anasarca and orthopnoea. Menstruation set in at the age of 21 and disappeared at

28. Had one child who died early. Acute rheumatism at the age of 14, and since then had symptoms of myocarditis with exacerbation in 1902 and 1903, asthma and chronic bronchitis; in 1904 right hemiplegia with aphasia and a slight degree of recovery. Failing compensation with severe dyspnoea in 1906, right sided pneumonia in 1908, dysentery in 1909, pneumonia and jaundice in 1911.

Condition on admission. A pale, emaciated woman, with marked ascites and generalized oedema, dyspnoea and orthopnoea and precordial pain, the right arm and leg paretic, of good intelligence, nervous system normal, the liver much enlarged, a trace of albumin in the urine but no casts.

Examination of the heart showed great irregularity (auricular fibrillation), marked venous pulsation (positive venous pulse) in the neck, very diffuse impulse, increased pear-shaped cardiac dulness, a presystolic murmur at the mitral area with accentuated second sound. Examination by Dr. Martin on two occasions *showed a faint thrill and presystolic murmur localized towards the middle of the precordium in the fourth left interspace.* The symptoms of failing compensation increased gradually, bronchitis with marked oedema set in and *terminal cyanosis.* Died November 13th, 1912.

Autopsy showed the condition of the heart detailed above, also fibroid myocarditis, general anasarca, hydrothorax, ascites, emphysema, osteomyelitis, passive congestion of organs, anaemia.

Examination of the heart showed an enormously large organ, the increase in size being due to alterations in both auricles and in the right ventricle. The auricular septum presented a huge gaping foramen ovale, incapable of closure, 2 cm. long by 1.5 cm. wide. The valvula foraminis ovalis was greatly thinned and increased in size measuring 6 cm. in diameter, bulging into the left auricle and presenting a crescentic free border, in part calcified, which formed the lower border of the permanently patent foramen. This was bounded above on the side of the right auricle by the flattened and much fenestrated annulus ovalis, a direct continuation of which extends to the wall of the right auricle where it was inserted just above the Eustachian valve, cutting off a shallow triangular sulcus, into the depths of which several channels open from the surrounding musculature. The Eustachian valve is large, but is not fenestrated. It is separated from the base of the tricuspid valve by a large bulging area caused by localized dilatation and hypertrophy of the musculature so marked as to form practically an accessory chamber in the depths of which lay the fenestrated Thebesian valve.

guarding the orifice of the greatly dilated coronary sinus, which presented a varicose aneurism in its course. This chamber was evidently a compensatory development to accommodate some unusual condition of the circulation. Investigation of its floor showed several openings admitting a large probe, one of which passed for a long distance beneath the endocardium of the left auricle. Examination of the left auricle showed its endocardium greatly thickened and that covering its anterior wall the seat of a curious formation in the form of a narrow thick walled pocket 2 cm. deep, with a crescentic upper free border attached by slender cords to the wall of the auricle. The depths of this pocket lay in close contiguity to the muscular channel running from the accessory chamber in the right auricle, and suggested that a communication existed here between the two auricles though none was definitely made out.

The right auricle was enormously dilated and very thin walled, the tricuspid orifice was dilated, and the right ventricle was greatly hypertrophied and dilated, especially in its conus; the pulmonary orifice and artery were greatly dilated measuring 9 cm. in circumference.

The left auricle was dilated and its wall also distinctly hypertrophied, the mitral valve was markedly thickened and contracted, an extreme button-hole stenosis existing. The left ventricle was practically unchanged. The aorta was smaller than the pulmonary artery, measuring 7 cm. at its orifice, and only 4 cm. at the orifice of the left subclavian (slight coarctation). A short ligamentum arteriosum connected the aorta at this point with the pulmonary artery.

ON THE DIFFERENTIATION OF TWO FORMS OF CONGENITAL DEXTROCARDIA.

By M. E. Abbott and J. C. Meakins,
McGill University, Montreal.

The heart may lie to the right of the median line in the thorax from a variety of causes, congenital and acquired. Three distinct types may be recognized. In the first of these, to which the name of *dextro-versio cordis*, may be applied, the alteration in position is due to extraneous causes, the organ being pushed, pulled or dislocated to the right from pathological conditions outside of itself, such as effusions or new growths in the left pleura or lung. In these cases the causative factor causing the displacement, is usually acquired or post-natal disease, but in some rare instances it may be of congenital origin, as for instance, in great enlargement of the left lung from congenital cystic disease. In these cases although the heart is displaced to the right the apex still points to the left and is usually felt during life not further to the right than the right sternal border.

In the other two types the condition consists, not in a simple pushing over of the heart to the right, but in its congenital malposition from causes acting within the heart itself. These are the cases of true congenital dextrocardia. In these the heart is situated to the right of the median line, and the apex points to the right, the apex beat during life being situated some distance to the right of the right sternal border. We owe the clear differentiation of these two forms of congenital dextrocardia to the studies by Kuchenmeister,[1] in a casuistic contribution on 125 cases, and more recently by Nägel[2]. The two forms of true congenital dextrocardia may be distinguished as types A and B.

In *type A* there exists a true transposition of the heart. Here all the cavities with their afferent and efferent vessels are reversed in relation to each other, so that a mirror-picture of the normal heart results. This condition is practically always associated with a more or less complete transposition of the other viscera, a *situs inversus* existing. In these cases the apex which points to the right is formed by the ventricle that normally lies on the left side, namely, that receiving blood from the left (pulmonic auricle). So also the chambers here occupying the left side of the heart are those lying normally on the right and receiving blood from the venae cavae. This condition cannot be regarded as pathological and is the result, not of an arrest of development, but probably of the inversion of the embryo in its relation to the primitive yoke-sack.

Type B. In this, the other form of congenital dextrocardia, the heart is not reversed upon itself, but is simply placed more or less in the right side of the thorax, and its apex points to the right and is formed by the right, that is the caval ventricle. The auricles maintain their normal relation, that on the right side receiving the venae cavae, and that on the left side receiving the blood from the pulmonary veins, which passes into the ventricle lying on the left side of the heart, and giving off the aorta.

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[1] Kuchenmeister, Leipzig, 1883.

[2] Nägel, Deut. Arch. f. klin. Med. vol. XCVI, p. 552.

These cases are plainly due to arrest of development in the early embryonic stage, in which the heart lies chiefly on the right side, and the apex is formed of the right side of the common ventricle, which at that time preponderates over the left. They are practically always associated with marked cardiac defects, such as absence or defect of the septa, transposition of the arterial trunks, pulmonary hypoplasia, etc., a fact which gives additional proof of their origin in an arrest of development. These conditions are pathological and place the subjects of this type of dextrocardia in the class of those suffering from congenital cardiac disease.

The differentiation of these two types is excellently brought out in a set of diagrams by Nägel in his article on this subject, which are reproduced in Figures 1 to 5. We have added in

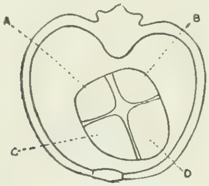

Fig. 1.—Normal Heart. A, Caval Auricle; B, Pulmonary Veins Auricle; C, Right Ventricle (Caval Blood Ventricle); D, Left Ventricle (Pulmonary Blood Ventricle).

Fig. 1. *Diagram of Normal Heart.* The apex points to the left, and is formed by the left (pulmonic blood) ventricle.

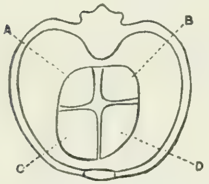

Fig. 2.—Embryonic Heart. A, Caval Auricle; B, Pulmonary Veins Auricle; C, Right Ventricle (Caval Blood Ventricle); D, Left Ventricle (Pulmonary Blood Ventricle).

Fig. 2. *Diagram of Embryonic Heart.* The apex points to the right, and is formed by the right (caval blood) ventricle.

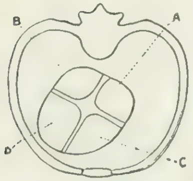

Fig. 3.—Mirror-Picture of Normal Heart. A, Caval Auricle; B, Pulmonary Veins Auricle; C, Right Ventricle); D, Left Ventricle (Pulmonary Blood Ventricle).

Fig. 3. *Diagram of Mirror Picture of Normal Heart.* The apex points to the right and is formed by the left (pulmonic) ventricle, and the caval and pulmonic auricles lie in reversed relations on the left and right sides respectively.

Fig. 4.—Pure Congenital Dextrocardia Due to Embryonic Arrest. A, Caval Auricle; B, Pulmonary Veins Auricle; C, Caval Blood Ventricle; D, Pulmonary Blood Ventricle. Note Similarity to No. 2.

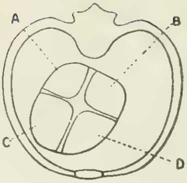

Fig. 4. *Diagram of Heart in Pure Congenital Dextrocardia due to Embryonic Arrest* of development. Note that the apex points to the right, and is formed by the right (caval blood) ventricle, as in Fig. 2.

Fig. 5.—Congenital Dextrocardia in Situs Inversus (Mirror-Picture). A, Caval Auricle; B, Pulmonary Blood Auricle; C, Caval Blood Ventricle; D, Pulmonary Blood Ventricle.

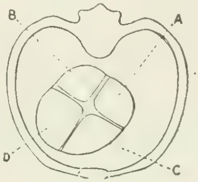

Fig. 5. From a case of *Pure Congenital Dextrocardia in Situs Inversus (mirror-picture dextrocardia).* Note that the apex points to the right and is formed by the left (pulmonic blood) ventricle, as in Fig. 3.

From Nägel's Pure Congenital Dextrocardia, *Deut. Arch. f. klin. Med.* XCVI. P. 572.

Fig. 6.—Grunmach's Case of Pure Congenital Dextrocardia (Arrest in Embryonic Stage). E, Vena Cava Superior; F, Ventriculum; G, Aorta; H, Ventriculum Sinistrum.

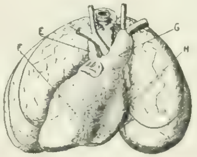

Fig. 6. Picture of *Grunmach's case of Congenital Dextrocardia* without Situs Inversus *due to arrest of development.* Note that the apex points to the right but is formed by the right (caval blood) ventricle as in Figs. 2 and 4. See his article Berlin klin. Woch. 1890, p. 22.

The auricles are designated "caval" and "pulmonary" (according to the veins they receive), instead of right and left, in order to show the difference in situation in the mirror-picture cases, from that of the usual type of pure congenital dextrocardia due to embryonic arrest(Grunmach's case).

Figure 6, the sketch of a case figured by Grunmach of the type of dextrocardia due to arrest of development in which the apex points to the right and is formed of the right (caval) ventricle, and in which grave defects of development are associated.

It is seen from the above statement that these two types, A and B, of congenital dextrocardia are of very different clinical import, that of Type A (mirror-picture Dextrocardia) *in situs inversus*, occurring in otherwise normal and perfectly healthy individuals, and being of interest purely from the standpoint of a natural anomaly. That of type B, due to embryonic arrest, on the other hand, belonging to the gravest and most complicated forms of congenital cardiac disease, and almost always certainly associated with the symptom-complex of cyanosis and clubbing.

The fact that the electro-cardiogram supplies a definite diagnostic method for distinguishing the dextrocardia of *situs inversus* from the normal condition and also from the dextrocardia due to embryonic arrest of development is of great interest.

The electro-cardiograph differentiates the cases of mirror-picture dextrocardia (Type A) from the normal condition and from the dextrocardia due to embryonic arrest (Type B). In the normal heart the Sino-auricular node is situated at the junction of the Superior Vena Cava (*dextra*) and the right auricle, while in mirror-picture dextrocardia, the Sino-auricular node is placed at the junction of the Superior Vena Cava (*sinistra*), thus there is in the latter a complete inversion of the sino-auricular node in the relation to the body in general. In the normal electro-cardiogram, Lead I is taken from the right arm to the left arm. If a similar lead is taken in a case of mirror-picture dextrocardia, the electro-cardiographic tracing in the latter condition will be the exact inverse of the normal case. This can be further proven by reversing the current in the normal case from the left arm to the right arm, when an inverted tracing will be obtained, whilst in a case of mirror-picture dextrocardia the lead from the left arm to the right arm will give a tracing similar to the right arm—left arm lead in a normal case. Leads II and III are reversed but not inverted.

In a case of dextrocardia of congenital defect, in which the apex lies to the right, and is formed by the right ventricle, (Type B), a definite electrocardiographic tracing is obtained. In such a case there is a marked preponderence of the S summit in Lead I, with no or very little R summit, whilst in Lead III the R summit is very much exaggerated while the S summit may be absent.

EXPERIENCE DEPARTMENT

Members are invited to contribute to this Department, (1) by sending to the Editors any subject of enquiry which may suggest itself to them on which a future experience-circular might be framed; (2) by replies, which will receive due publication, to any of the questions already stated in the two experience circulars given below.

Experience Circular No. 1

ON THE PRESERVATION OF THE NATURAL COLOURS OF MUSEUM PREPARATIONS.

(Issued January, 1910.)

Enquiry made by Prof. A. S. Warthin, President International Association of Medical Museums, University of Michigan, Ann Arbor, Mich.

Replies addressed to Dr. Maude Abbott, Secretary International Association of Medical Museums, McGill University, Montreal, Canada.

Sixteen replies were received to this circular from widely different sources, and were published in Bulletin No. III. where they form a valuable compendium of actual experience. Two additional replies, received since then, are inserted below.

Enquiry.

Give in detail the method which, in your own experience, has yielded best results (or state where described, if published by you).

2. Mention any personal modification of method.

3. Describe results in so far as color is concerned, stating colors preserved, colors fading or not preserved, changes of color, heightened or lowered, contrasts, etc.

4. State length of time that such color preparations can be kept without deterioration.

5. State effects of light.

6. State effects of heat.

7. State effects of exposure to air.

8. Method of preserving for exhibition. State type of Museum jars used, method of sealing jar, etc. (or where described).

9. If preparations are used for demonstration purposes, state manner of keeping specimens and method of using them.

10. Give experience with moulds and bacterial infections. Methods of prevention.

11. Give results of experience with gelatin or jelly methods, with particular refernce to the occurrence and the prevention of liquefaction.

12. Is it, in your opinion, worth while to attempt the preservation of colors in Museum specimens as standard or stock preparations when the supply of fresh material is sufficient for teaching purposes?

13. Suggestions as to methods of using color preparations for teaching purposes.

14. Give cost of method, amount of care necessary to keep preparations in best condition, and frequency of renewal?

REPLIES.

(Received too late for publication in Bulletin III.)

XVII.

From the Department of Pathology, Columbia University, New York.

PROF. W. G. MACCALLUM.

1. Two methods which we have employed for the preparation of museum specimens have yielded results which are, in the main, quite satisfactory.

(a) The preservation of large specimens in jars, following closely the well-known Kaiserling method.

(b) Gelatin plate preparations of material treated by Kaiserling's method. See question No. 11.

2. No modifications.

3. For an approximate preservation of natural colors the material must be fresh, and the surfaces of the specimens free from blood-smears and bile.

4. Even under the most favorable conditions the colors gradually become less brilliant when preserved in the final Kaiserling solution.

5, 6, 7. We have made no specal tests of the influence upon the specimens of light, heat and exposure to air. Light does seem to affect the colors deleteriously.

10. Thymol keeps the jars free from moulds, etc.

11. The gelatin plate method is highly satisfactory for the preservation of suitable specimens. Our technique is briefly as follows:

(a) Fixation by Kaiserling's method.

(b) With a sharp knife thin slices (1.5 cm. or less) are cut from the specimen in such a way as to best illustrate the lesion in hand. These slices are freshened in 95% alcohol and placed in Kaiserling No. 3.

(c) Petri dishes (E. Leitz) measuring 14 cm. in diameter and 1.2 cm. in depth are partially filled with gelatin, the slices of tissue immersed therein, and the gelatin allowed to cool. A typewritten label is now pasted at the desired point on the surface with gelatin, and this having hardened, the dish is filled until the surface of the gelatin is markedly convex, and the top put on. The dish is sealed with melted paraffin after the gelatin has hardened.

Notes.—(1) Gold Medal Gelatin, (A. H. Thomas & Co.) is satisfactory. The yellowness of the gelatin should be neutralized by the addition of a sufficient quantity of a watery solution of methyl-violet (Bruére & Kaufmann, Bull. III of this Association). The result is a beautifully clear, faintly bluish gelatin.

(b) Five drops of 40% formol are added to each 100 c.c. of the gelatin just before it is used.

(c) The only difficulty in preparing gelatin-plate specimens is the putting on of the covers of the Petri dishes in such a manner as to avoid bubbles in the finished preparation. A small amount of gelatin should be poured in the covers, and this allowed to cool as a thin layer free from air bubbles. This step greatly facilitates the placing of the covers.

Spleen and pneumonic lungs cause liquifaction of the gelatin almost without exception. The gelatin-plate method is rather costly and time-consuming, but if the specimens are selected with care the results well repay the effort. By no other method that we know, can such beautifully clear and instructive preparations be produced.

XVIII.

From the Pathological Department, University of Melbourne, Australia. PROF. H. B. ALLEN.

"We are using Heidenreich's method largely, and find the results generally satisfactory, the chief defect being the amount of shrinking. We have not succeeded in finding a good method for the heart, especially for the thrush-breast heart of pernicious anaemia and similar conditions. We are troubled with liquefaction in our glycerine jelly preparations of sections of the eye, occurring apart from any bacterial contamination, possibly from soluble ferment. We have here followed the formula of the Ophthalmological Society of London."

Experience Circular No. 2

DIFFICULTIES (A) IN SPECIAL METHODS OF HISTOLOGICAL TECHNIQUE. (B) IN TECHNIQUE OF THE PREPARATION OF GROSS MUSEUM MATERIAL.

(Issued December, 1912.)

This subject was suggested by Prof. R. M. Pearce of Philadelphia and questions upon it were invited from members. The replies to the circular thus framed, which are published in this Bulletin, formed the basis of a symposium which was one of the most important features of the programme of the meeting of this Association held in conjunction with the International Congress of Medicine in London, August 6th to 13th, 1913.

ENQUIRY.

A. Histological Technique.

1. Give suggestions as to the best method of storing and filing histological specimens in the Medical Museum. Enquiry by Prof. Adami, McGill University.

2. State with details, the methods of staining which you have found to afford the most permanent histological preparations. Enquiry by Prof. Adami, McGill University.

3. What are the best methods of clarifying embryos for microscopic study by oil of wintergreen and benzol? Enquiry by Prof. Sabin, Baltimore, Md.

Method of Embedding.

4. What are the best methods for softening chitinous structures of insects and larvae preparatory to embedding and sectioning? Enquiry by Prof. S. B. Wolbach, Harvard Medical School.

5. Which of the solvents—xylol, chloroform, cedar-oil, methylol, acetone—is preferred for dissolving paraffin in the paraffin method of embedding? Enquiry by Prof. Poujol, Algiers.

6. State method of paraffin embedding for Weigert's nerve stain. Enquiry by Prof. Streeter, Ann Arbor, Mich.

Methods of Staining.

7. What are the best methods of staining fresh tissues for diagnostic purposes? Enquiry by Prof. Louis B. Wilson, Rochester, Minn.

8. State improved methods of staining spirochaetes in tissues. Enquiry by Prof. Warthin, Ann Arbor, Mich.

9. How to obtain Van Gieson's preparations without rapid loss of coloration, or Mallory's with well stained nuclei. Enquiry by Dr. Réné Sand, Brussels, Belgium.

10. To find a constant method for staining glia tissue. Weigert's, Mallory's, Benda's are very capricious. Enquiry by Dr. Réné Sand, Brussels, Belgium.

11. What is the best method for the demonstration of the intracellular canaliculi (trophospongium) in nerve and gland cells? Enquiry by Prof. J. C. Simpson, McGill University.

12. To find a specific stain for cholesterin esters. Enquiry by Prof. W. G. MacCallum, New York.

Special Problems.

13. Microchemical reaction in tissues. What are the best means of showing the iron reaction, calcium salts, fats, etc., in tissues, and what are the difficulties encountered? Enquiry by Dr. Sprunt, Baltimore, Md.

14. Vital staining of tissues. State method of injection used and the best way to preserve such tissues by section methods for finer study; what difficulties arise and what are the problems to the study of which this method is adapted? Enquiry by Winternitz, Baltimore, Md.

15. Living tissues. Give experience of those working on the growth of living tissues in blood plasma and other fluids, with especial reference to the examining and staining of cultures as prepared by the methods of Harrison, Buroughs and Carrel. Enquiry by Prof. Pearce, Philadelphia, Pa.

B. Museum Technique.

16. What are the best means of mounting delicate material without tearing? Enquiry by Mr. Charles F. Silvester, Princeton, N. J.

17. What have you found to be the best methods of maceration? Enquiry by Prof. Huber, Ann Arbor, Mich.

18. The best method of distending for Museum purposes hollow structures which have already been cut into. Enquiry by Prof. W. G. MacCallum, New York.

19. The best method of fixing on the tops of square Museum jars. Enquiry by Prof. W. G. MacCallum, New York.

REPLIES.

(Those replies which deal at length with a single subject and which are of sufficient importance, are published as independent articles in this Bulletin, their title and page reference only being given below.)

I.

From the Department of Pathology, University of Pittsburg.—Dr. William Coburn.

Query 19. A Cement for Sealing Rectangular Museum Jars. See article in this Bulletin, page 86.

II.

From the Department of Histology and Embryology, University of Michigan.—Prof. G. Carl Huber.

Q. 17. A Method of Maceration Preparatory to Teasing. See article in this Bulletin, page 96.

III.

From the New Medical Schools, Cambridge, England.—Mr. F. A. Izzard.

Q. 16. *To mount delicate material.* Fastening the preparation on a sheet of glass with gelatin; or fasten the preparation on one of the two sides, of the inside of the jar with gelatin.

Q. 17. *A rapid method of macerating bones.* The preparation to be macerated, say, for instance, a wrist joint, fresh from the operating theatre, should be prepared as follows:

Take the preparation, and make several superficial incisions about it, taking care that the incisions are only a little deeper than the skin, because, should the specimen be a periosteal sarcoma, or anything of a delicate nature, the knife, cutting too deep, may distort, or even spoil, the whole effect of the beautiful coral appearance which can be obtained by this method. Having prepared the specimen thus far, you should then proceed to put it into a pan containing water (rain water preferred), which should be at 85° Fahrenheit, and kept at that, until the specimen has finished macerating. It is necessary to change the fluid about every four days, or otherwise the fluid becomes stagnant and hinders the process of rapid maceration, besides allowing the fat to solidify inside the bones, which would cause a deal of trouble.

The fluid should be changed every four days until the bones can be seen to be perfectly free from any soft material. The bones can then be taken from the pan and scalded with two or three kettles of boiling water, which will clean off all the excess of filth from the bones, and the biggest portion of the fat will also come from them. You then get another supply of boiling water and scrub the bones with a plentiful supply of soap, using a tooth brush, as the ordinary nail brush is much too coarse. Having done that, you scald the bones again with another kettle of water to clear them of any sediment of soap or maceration material which may still hang about them. You then put the bones to drain and dry in the sun or by a fire. When they are perfectly dry you should then examine them to see if there are any signs of grease left in them. If this method is strictly adhered to, as a rule, they are perfectly free; but should any signs of grease be detected, they should be put into "benzoline" for two or three days, when the grease will soon leave them.

When the bones are taken from the benzoline they should be drained and scrubbed again with hot water and soap and dried as before. They will, as a rule, dry a very good color, but to get them particularly white they should be put into a 10 per cent. solution of peroxide of hydrogen (distilled water being used) for several days. They will take no harm if they are left in longer. You then take them from the bleaching solution and drain and dry as before. The bleaching solution can be used for several specimens before becoming stagnant and useless. Any use of the knife should be abandoned after you have made your first incision. The main points of this method are: *that you should keep the proper temperature throughout*, as it can clearly be seen that the secret of this method is "*maceration by bacteria*."

It would be well to mention that before putting bones into benzoline a couple of small holes might be made to allow the benzoline to enter more quickly. Another point worth mentioning is, to put two plates on the bottom of the macerating pan while the maceration is proceeding, as the bones sometimes tend to get stained through lying on the tin. The plates will also aid in regulating the heat. They should be put in the pan upside down.

Q. 18. *To distend hollow structures which have been cut into.* Take a piece of glass rod, and bend it over a Bunsen burner to the size and contour of the cavity to be held out; and then stitch it inside the cavity.

Q. 19. The method I have found best *to fix on the tops of square jars,* is to warm the top of the jar; and then, for the cement, the material that Mr. Judah uses; you then warm the glass top and carefully press on the cement; and then finish off in the ordinary way.

IV.

From the Medical Museum, McGill University, Montreal, Canada.
—Mr. E. L. Judah.

Q. 16. *Delicate specimens* that are strong enough to stand stitching can be sewn on thin sheets of mica cut to fit the required size of the jar, or a cylinder of the same material large enough to hold the specimen can be placed around it and held in the centre of the sheet with a few very fine stitches. Put a round cover on in the same way, always using a very thin needle. When clear white mica is used, it will be almost transparent. R. H. Burne, Esq., of the Royal College of Surgeons, London, England, mounts embryos most beautifully in this way.

Q. 17. *Maceration of Bone.* Mr. F. A. Izzard's method described in this Bulletin, and in the Laboratory Journal for March, 1913, is simple and gives good results.

Prof. Dr. Obendorfer, München-Schwäbing Krankenhaus, Germany, has a very good apparatus for rapid maceration, which is connected up with the drains in such a way that there is no odor from it whatever. It is figured and described in the *Frankfurter Zeitschrift fur Pathologie,* Bd. X, Hft. 3, 1912.

Prof. Dr. Ludwig Pick, Friedrichshain Krankenhaus, Berlin, Germany, has a very good apparatus for the removal of grease, which is described in the *Centralblatt f. path. Anat.* 1909, No. 1.

Q. 18. *Hollow structures may be distended* by hoops and crescent-shaped bits of glass rod with eyelets at each end. They should not be cut open until after they have been hardened.

Q. 19. *A Cement for Sealing Museum Jars.*

See article by Muir and Judah in this Bulletin, page 87.

V.

From the Department of Pathology, College of Physicians and Surgeons, New York.—Dr. R. A. Lambert.

14. *On the Staining of Tissues Growing in Vitro.*

See article in this Bulletin, page 98.

VI.

From the Pathological Department, University of München.—Dr. Georgine Luden v. Heomen.

Q. 2. *Permanent histological preparations.* I have in my collection a slide stained after my method published in (*Centralbl. Path.*, also in this Bulletin) in 1910, from a case of locomotor ataxia, which still shows every detail as clearly as the day it was made.

Q. 5. *Best solvent for paraffin.* "I have found cedar oil a very satisfactory solvent with which excellent results are obtained if the 'soft' paraffin is renewed two or three times."

Q. 6. "I should like to try the method of paraffin embedding for Weigert's nerve stain described in my second article, as I found it most satisfactory for my own method, which is after all based upon the same principles as Weigert's, and is merely a reliable, simple, and rapid modification of this."

VII.

From the Department of Zoology, University of Princeton, N. J.—Dr. Chas. F. Silvester.

Q. 16. *On mounting delicate material.*

See note in this Bulletin, page 45.

VIII.

From the Department of Pathology, St. Mary's Hospital, Rochester, Minn.—Dr. Louis B. Wilson.

Q. 27. *Staining fresh tissue for diagnostic purposes.*

See article in this Bulletin, page 105.

IX.

From the Department of Pathology, University of Buffalo, N. Y.—Prof. Herbert U. Williams.

Q. 5. I have done quite a good deal of work with paraffin, and have tried the first three solvents named, xylol, chloroform, and cedar oil. I always use xylol now, and it seems to me perfectly satisfactory.

DEPARTMENT OF EXCHANGES

One of the most important functions of this Association is the development of an international system of exchange of museum specimens and pathological material for microscopic investigation. This exchange is conducted by means of correspondence, a circular letter being sent out from time to time by the Secretary, requesting a statement of material wanted and material offered in exchange, and the announcements received in reply being published in the succeeding Bulletin, or made in the intervals of publication by means of a printed circular. Up to the outbreak of the war the response received from foreign members had been good, and a number of important exchanges had been transacted. Since then, very few requests or offers for exchange have been reecived, a circumstance probably directly due to the fact that international activities of all kinds have necessarily almost entirely ceased. It is the more important that this department should be kept in operation among members between whom communication is still possible, in the hope that at some later date the reestablishment of peace may see its international usefulness restored.

CONDITIONS OF EXCHANGE.

1. Request or offers of material may be made to the Secretary by whom they will be circulated.
2. The exchange may be transacted either through the Secretary or directly between the giver and the recipient. Before any material is sent to any applicant he must be notified of the intention of the proposed donor, in case his request has already been granted by some other member of the Association. If the material offered in exchange by the recipient of a given specimen is not such as is needed by the donor, the latter is requested to communicate his need to the Secretary, who will make a special effort to obtain, through correspondence as well as through the columns of the Bulletin, his particular need.
3. The cost of transportation is in all cases to be paid by the institution receiving the material transported.

4. If the specimens are very small, they may be sent by post. Large specimens should be transported, not in individual glass jars, but in bulk, wrapped in moist wool or cheese-cloth, and packed in soldered tin or other water-tight receptacle.
5. Each specimen should be tagged with its reference number.
6. A statement of the nature of the specimen and, where possible, a brief history of the case, should be forwarded to the recipient.

EXCHANGES REPORTED:

As a result of the announcements made in Bulletin No. IV, exchanges have been participated in between the following Institutions and individuals: Prof. Alex Ferguson, Government School of Medicine, Cairo, Egypt; Prof. O. C. Gruner, Royal Victoria Hospital, Montreal, Canada; Prof. Oskar Stoerck, Pathologische-anatomisches Institut, Wien, Austria; Prof. R. P. Strong, Department of Tropical Medicine, Harvard Medical School, Boston, Mass.; Profs. J. G. Adami and J. L. Todd, Drs. Maude Abbott and Joseph Kaufmann, McGill University, Montreal, Canada.

EXCHANGES PROPOSED.

Prof. J. G. Adami, McGill University, Montreal, Canada.

Requests:

Monstrosities; embryos in all stages; intestinal parasites, especially *Taenia solium*, and lung flukes, adult worms of *Filaria sanguinis*.

Offers in Exchange:

Typhoid intestine.

Dr. Maude Abbott, McGill University, Montreal, Canada.

Requests:

Anomalies of the heart; very early embryos for serial section of heart.

Dr. F. W. E. Burnham, Winnipeg, Man.

Requests:

Stained blood films showing parasites, or pathological blood conditions.

Prof. Oswaldo de Cruz, Institute de Manguinhos, Rio de Janeiro, Brazil.

Requests:

Spleen from Kala-azar.

Offers in Exchange:

Spleen from Blastomycosis.

Prof. W. G. MacCallum, College of Physicians & Surgeons, New York, N. Y.

Requests:

Bone, and other tissues in cases of infantile scorbutus. Tissue from sclerema infantum.

Offers in Exchange:

Parathyroids; tertiary syphilitic lesions.

Dr. Chas. F. Silvester, Dept. of Comparative Anatomy, Princeton, New Jersey, U. S. A.

Requests:

Embryos of South American Monkeys.

Dr. Joseph Kaufmann, McGill University, Montreal, Canada.

Requests:

Ova from all forms of intestinal parasites; blood films from cases of all blood diseases.

Prof. Allen J. Smith, McManes Laboratory of Pathology, University of Pennsylvania, Philadelphia, Pa.

Offers in Exchange:

Lantern slides showing various bacteriological lesions made from stained films at the request of the correspondent at a cost of fifteen cents a slide.

Prof. R. P. Strong, Dept., Tropical Medicine, Harvard Medical School, Boston, Mass.

Requests:

Any material from bacillary dysentery; amoebic dysentery; balantidial dysentery; kala-azar dysentery; lesions of sprue, tongue, mouth, stomach, intestines; Asiatic cholera; yellow fever; leprosy; beriberi, heart and pericardium; liver with amoebic and also trematodal infection; lung with amoebic and also trematodal infection; Malta fever spleen; bubonic plague all lesions; malaria all lesions; black water fever, kidneys; yaws; trypanosomiasis slides; kala-azar all lesions; ulcerating granuloma of the pudendum; epidemic gangrenous rectitis; tropical sloughing phagedaena; Oriental sore (Delhi boil); ainhum; elephantiasis, filaria; bilharzia infection particularly rectum and bladder; paragonomiasis, lungs and other organs infected; distomiasis, liver and other organs; uncinariasis, intestines and other organs; mycetoma (Madura foot); pellagra; tinea imbricata (skin).

Prof. J. L. Todd, McGill University, Montreal, Canada.

Requests:

Kala-azar; all material both gross and microscopical. Slides of *Aleppo Boil.* Slaty spleen in malaria; microscopic slides showing thrombosis of capillaries, brain or other organs by malarial parasites. Slides of smallpox and vaccine bodies. Balantidium coli. Adult worm Taenia echinococcus. Paragonium westermanii. All material from Bilharzia haematobia. All material from Schistosomum cattoi. Slide and muscle of Trichina spiralis. Adult worm of filaria loa. Adult worm of bancrofti. Adult worm of perstans. Adult worm and larvæ of F. volvulus. Strongyloides. Porocephalus. Thrombidia. Conorhinus sanguisuga. All ticks and biting insects important as parasites in North America.

Offers in Exchange:

Glossina palpalis, (Tsetse flies). Ornithodoros moubata (human ticks). Slides of spirochetes.

REPORTS

SECRETARY'S INTERIM REPORT FROM THE MEETING OF APRIL 1ST, 1912, TO THAT OF AUGUST 6th, 1913.

The Organization of the Section of Museum Technique of the International Congress of Medicine.

At the last regular meeting of this Association on American soil, held at Philadelphia on April 4th, 1912, a letter was read from Prof. Arthur Keith, President of the Museum Committee of the XVIIth International Congress of Medicine, suggesting that the next International meeting of the Association take place in conjunction with the meeting of the Congress, and promising his active co-operation. Resolutions were passed to the effect that this, the first meeting outside of North America should be held, as suggested, at London, England, in August, 1913, and that the Council of this Association be recommended to consider plans for the improved organization of this Association on the international basis, and the formation of a local American Section under the International Body, these plans to be submitted to a special meeting of the American and Canadian Members, which was to be held at Washington in May, 1913, the results to be acted upon at the regular International meeting in London, in August, 1913.

On January 18th, 1913, a letter was received from Mr. H. W. Armit, Secretary of the Museum Committee of the Congress, inviting the co-operation of this Association in the organization of the Section of Museum Technique of the Museum of the International Congress of Medicine. Action was immediately taken by the Association, and circular letters were drawn up by the Secretary inviting contributions under the division of Preparation and Preservation of material, Museum Housing and Display, and Museum Administration, which were sent out by the joint action of this Association and of the Museum Committee of the Congress. A liberal response was made, especially by the members of the International Association of Medical Museums, resulting in the development of what proved to be one of the richest Sections of the Congress Museum. As this matter is of permanent interest and as these letters may form the basis of future concerted action, they are published below:

International Association of Medical Museums.

May 1st, 1913.

XVIITH INTERNATIONAL CONGRESS OF MEDICINE. MUSEUM.

Section of Museum Technique.

Dear Sir:—

A special section of the Museum of the XVIIth International Congress of Medicine is being organized by the International Association of Medical Museums, with the collaboration of the Museum Committee of the Congress, for the purpose of illustrating advances in museum technique. Special attention will be paid to the subjects of museum administration, housing and display of museum material, preparation and preservation of museum specimens, cataloguing and teaching in the museum. The exhibits are intended both to give an opportunity for the demonstration of special museum methods employed by various workers to those interested, and also to present to the profession the uses to which the medical museum may be put and the scope and standard to which it may attain. Your co-operation is earnestly requested and you are invited to contribute exhibits under any or all of the subsections named in the detailed outline, enclosed. All exhibits are insured by a policy which covers all risks from the time they leave their owner until they are received again by him.

The Local Secretaries of the International Association of Medical Museums have kindly consented to receive and forward to the Museum of the Congress, specimens and other exhibits which are sent to them for this purpose, it being understood that the exhibitor agrees to pay his share of the expense of transit.

Enclosed I am sending you a copy of the regulations of the Museum of Congress to which is attached an application form which should be filled in and returned either to me or to the Hon. Secretary, Museum Committee, International Congress of Medicine, Ravenhurst, Talbot Road, Wembley, England, at the earliest possible date. Descriptive cards will be attached to each exhibit in English, German and French, explaining the exhibit in detail. The wording of your descriptions should be added to the back of the application form. In each case, it is desirable that the successive steps employed in the method should be demonstrated.

Hoping for an early reply, I am, dear Sir,

Yours very truly,
MAUDE E. ABBOTT,

Secretary International Association of Medical Museums.
The Pathological Museum, McGill University,
Montreal, Canada.

SECTION OF MUSEUM TECHNIQUE
OF THE
XVIITH INTERNATIONAL CONGRESS OF MEDICINE.

Meeting at London, England, August 6th to 13th, 1913.

DETAILED OUTLINE OF SUBSECTIONS.

I.

PREPARATION AND PRESERVATION OF MATERIAL.

NOTE—All exhibits in this section should represent, where possible, the different steps in the process, from the raw materials used in the preparation, to the finished result in the mounted specimen.

1. *Gross specimens.*
    - (*a*) Methods of preparation.
        - Methods of dissection — instruments recommended, etc.
        - Methods of maceration.
        - Methods of corrosion.
        - Methods of injection.
        - Methods of decalcification.
        - Methods of rendering organs transparent (e. g. Spalteholz).
    - (*b*) Methods of Preservation.
        - Fixing and hardening parts *in situ.*
        - Preservation of natural color of organs.
        - Fixing of pigment.
        - Fixing of soluble contents.

- (*c*) Methods of Mounting.
  - Mounting of dry specimens, articulating of bones, etc.
  - Mounting of moist specimens with or without frames.
  - Mounting under clock glass.
  - Mounting of parasites.
  - Mounting of embryos.
  - Mounting of calculi.
  - Mounting of gelatin.
  - Transparent mounts in oils.
  - Mounting of delicate speicmens.
- (*d*) Methods of re-examination of specimens, restoring microscopic appearances, and remounting to display characteristics.
- (*e*) Museum jars, types and sizes used, and methods of sealing.

2. *Preservation of Microscopic Material.*
3. *Preparation of Models, Casts, Reconstruction Methods, etc.*

II.

METHODS OF HOUSING AND DISPLAY.

1. *Shelving of Gross Material.*
   - (*a*) For students' use.
   - (*b*) For storage.
   - (*c*) For display in Museum—type of cases used, etc.
2. Methods for open display of photographs, X-Ray plates, charts, and transparencies of X-Ray plates.
3. Photo-filing systems for serial arrangement of photographs, X-Ray plates, charts, etc.
4. Cabinets for microscopic slides.
5. Transportation of Teaching Material.

III.

MUSEUM ADMINISTRATION.

1. Methods of receiving, indexing, tagging, and labelling Museum material (a) in storage, (b) on Museum shelves, and of indexing and filing references.
2. Filing and indexing of photographs, X-ray plates, microscopic slides, models, etc.

3. Methods of classification of Museum specimens.
4. Methods of cataloguing.
5. Museum Teaching.
6. Museum Publications.

REPORT OF THE SIXTH STATED INTERNATIONAL MEETING OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS, HELD AT LONDON, ENGLAND, AUGUST 5TH, 6TH, AND 7TH, 1913.

Highly successful meetings of this Association took place at the Royal College of Surgeons and the Imperial College of Science at 2:30 p. m. on August 5th, 6th, and 7th last in conjunction with the XVIIth International Congress of Medicine. There was a large and representative international attendance, including the following: Sir William Osler, Bt., Prof. Arthur Keith, Dr. H. W. Armit; Prof. Ludwig Aschoff, Freiburg; Prof. Spalteholz, Leipzig; Prof. Courmont, Lyons; Prof. Gustav Roussy and Edouard Rist, Paris; Drs. Georgine Luden, de Josselin de Jong, Ariens Kappers and Murk Jansen, Holland; Prof. Wahby, Egypt; Dr. Réné Sand, Belgium; Prof. Fischer, Vienna; Prof. Sheridan Delépine, Manchester, and F. W. Andrewes, London; Drs. Harvey Cushing and Hugh Young, Boston; Prof. Adolf Meyer, Baltimore; Prof. W. G. MacCallum and Drs. E. Libman, R. A. Lambert and S. Baehr, New York; Prof. J. G. Adami, F. J. Shepherd and O. C. Gruner, and Drs. Maude Abbott and Lindsay, Montreal, Canada; Profs. A. S. Warthin and G. Huber and Dr. S. Case, Michigan; Dr. E. H. Kettle, H. J. Fry and F. Wood Jones, London; Prof. Duval, Tulane University; Prof. Vorowoff, Nice, Italy; Dr. Chas. F. Silvester and Prof. McClure, Princeton, New Jersey; Prof. Huntingdon, Boston; Profs. Dixon and McWeeney, Dublin, Ireland; Prof. Beattie and Mr. R. S. Frost, Sheffield; Profs. James Ritchie, Lorrain Smith and J. Lowden Smith and Mr. Richard Muir, Edinburgh; Dr. R. M. Buchanan, Glasgow; Prof. J. T. Wilson, Sydney, Australia, and others.

The meeting was opened by Professor Arthur Keith, Honorary President, who, as Chairman of the Museum Committee of the Congress and Curator of the Museum of the Royal College of Surgeons welcomed the members to London, and introduced the President, Professor A. S. Warthin, of Ann Arbor, Mich., who gave an address upon "The Ideals and Functions of the International Association of Medical Museums." The Association had entered upon its seventh year of existence and this was its second triennial international meeting. During this time it had grown from small beginnings to a membership of over 200, including among them the leading pathologists and anatomists throughout the world. It was an Association of Medical Museums, the scope extending beyond pathology into all the fields of medicine, particularly in the direction of preventive medicine and hygiene. At the present time there was a strong demand for a museum of preventive medicine on a popular basis, such as is illustrated by the travelling museums of the campaign against tuberculosis. The organization of such popular museums should be one of the special functions of this Association, as also the discussion of methods of demonstrative teaching of all kinds. The need of a society in which medical teaching in general, both demonstrative and otherwise, could be considered, was pointed out, and the plea made that this Society might widen its scope to include this field. The most important side of this Association was its International character and at this meeting the organization of the international body and of its local sectional societies was to be thoroughly worked out.

Sir William Osler opened a discussion on the improved organization of the Association on the international basis. He prefaced his remarks by a tribute to the memory of the late Sir Jonathan Hutchinson, whose recent death had removed from among us one who had been for many years a pioneer worker in the field of medical museums, a collector in the most scientific sense, whose remarkable breadth of interest and clearness of intellect made him a demonstrative teacher of the highest type. Especially in connection with the formation of the popular museum, which Dr. Warthin had rightly described as one of the special functions of this Association, the life work of this great man was of interest, and all those who could visit his wonderful popular museum at Haslemere would learn there the results, which careful classification of well-chosen material along any line can bring. Returning to the subject, Sir William believed in the usefulness of the Museums Association as an International Association of exchange of material and of discussion of methods both of technique and of demonstrative teaching. There were difficulties, of course, such as the geographical one, in its international development but he thought the plan suggested practicable, of a central bureau which would control the different branches in various countries and hold triennial meetings in the country where the International Medical Congress was held. Each country should be allowed a certain amount of autonomy in managing its own society, and under these conditions a highly useful work could be carried on.

Professor Ludwig Aschoff, Freiburg, spoke warmly in favour of the aims and objects of this Association. He saw no difficulty in the international organization, except as regards the international fee, which should be reduced somewhat as soon as the membership increased sufficiently to justify this. He recommended that a propaganda for the extension of membership be instituted by the local societies into various countries, and to this end that copies of the President's address be translated and circulated.

Professors Spalteholz, Leipzig, W. G. MacCallum, New York, J. G. Adami, F. J. Shepherd, Montreal, and others participated in the discussion and the following recommendations for the international organization were adopted:

(1) There shall be a central international body with international officers, and local or sectional societies with local officers, one society in each country represented.

(2) The meetings of the international body shall be held at the same place and time as the meetings of the International Congress of Medicine. The meetings of the sectional societies shall be held annually or more frequently, according to the decision of the individual society.

(3) The officers of the local societies may be elected annually or triennially, and shall consist of a President and Secretary, and as many other officers as the local Society shall decide. The officers of the International Association shall be as provided under the present constitution. They shall be elected triennially at the international meeting for the ensuing triennium and for the next international meeting, except the Secretary, whose position shall be permanent. The President shall whenever possible be elected from that country, where the next international meeting will be held.

(4) A local fee may be arranged at the discretion and option of the local society, but the international fee shall remain $2.00. It shall continue to be paid to the International Secretary and shall be devoted to the cost of the Bulletin, the payment of the international postage and other international outlay.

(5) The meetings of both the International Association and also of the sectional societies shall be reported in the Bulletin, and all communications presented at all such meetings shall be available for publication in the Bulletin. This will not preclude their publication elsewhere as well, nor is the Editorial Committee pledged to publish all papers presented at either the international or sectional meetings.

Mr. H. W. Armit, Secretary of the Museum Committee of the Congress, dwelt upon the relation, which such an Association as this might have, to the meetings of the International Congress of Medicine. After a prolonged experience in the organization of Congress Museums, the conclusion had been forced upon him that efficiency was sacrificed, much time lost, and valuable experience wasted, by the placing of arrangements at each Congress in the hands of a new set of comparatively untrained persons. In the International Association of Medical Museums we have a society of Museum experts, which seems peculiarly fitted to undertake the organization of the Congress Museum as a whole. It was therefore moved by Mr. Armit, seconded by Prof. Keith, and resolved: *That in future the organization of the Museum of the International Congress of Medicine be entrusted to the International Association of Medical Museums.*

The Secretary was instructed to write to the Secretary of the Standing Committee of the Congress, communicating this resolution to him and requesting that the Executive of the Association be put in communication with the National Committee or Government of the country where the next meeting of the Congress will be held.

The following officers of the international body were elected:
President, Prof. Ludwig Aschoff, Freiburg.
1st Vice-President, Prof. Arthur Keith, London.
2nd Vice-President, Prof. Pierre Marie, Paris.
3rd Vice-President, Prof. R. M. Pearce, Philadelphia.
Secretary-Treasurer, Dr. Maude E. Abbott, Montreal, Can.

Councillors, Sir William Osler, Bt., England; Prof. J. G. Adami, Canada; Prof. A. S. Warthin, United States; Prof. Bernard Fischer, Germany; Prof. Paul Courmont, France; Prof. J. Fibiger, Denmark; Prof. Askanazy, Switzerland; Prof. Harbitz, Norway; Dr. De Josselin de Jong, Holland; Dr. Réné Sand, Belgium.

The representatives of Local Sections in various countries who were present elected Local Committees.

A hearty vote of thanks was tendered to Dr. Arthur Keith and Dr. H. W. Armit for their courteous and efficient co-operation in the arrangements for the London meeting.

The following new members were elected: Profs: Paviot, Guill Nicolas, Jules Courmont, Hygiene, Leo. Testut, Anatomy, André Roque, and Drs. Latarget, Claudius Regaud, Lavy, Pollosson, Rendat, Fabrand, Bayle, Faculté de Médicine, Lyons, France; Prof's. Hoche and Ancel, Nancy; Prof's. Bosc and Grasset, Montpelier; Profs. Sabrazes, Bordeaux; Prof. Bardier, Toulouse; Dr. Nathan Raw, Mill Road Infirmary, Liverpool; Dr. E. J. Henderson, Anatomical Department, Edinburgh; Prof. J. T. Wilson, Sydney, Australia; Drs. F. Wood Jones and Helen Chambers, School of Medicine for Women, London; Prof. Wahby, Cairo; Drs. M. A. Ruffer and J. G. Willmore, Alexandria. Egypt; Prof. Werner Spalteholz, Leipzig; Prof. Oberndorfer and Dr. Georgine Luden van Heumen, Munich; Dr. Otto Ornstein, Berlin; Prof. C. McClure and Dr. C. F. Silvester, Princeton, N. Y.; Drs. T. P. Sprunt and M. C. Winternitz, Baltimore; Prof. A. A. Bruére and J. C. Meakins, Montreal; Drs. H. S. Bernstein and J. B. Craig, Albany, N. Y.; Prof. W. T. Connell, Kingston; Prof. M. Flint, Yale; Dr. J. H. N. Goff, San Diego, Cal.; Dr. W. P. Larsen, University, Minneapolis; Prof. Harvey Marshall, Virginia; Mr. Richard Muir, Edinburgh; Dr. Ariens Kappers, Holland.

The following financial statement was submitted:

THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

Treasurer's Report.

From April 4th, 1912, to August 1st, 1913.

Cr.

To balance in hand April 4th, 1912	$117.13
Membership Fees April 4th, 1912, to August 1st, 1913	231.46
Received from Prof. Fibiger for printing Errata Slips	2.00
Interest on deposit in Bank	4.07
Total received	$354.66

Dr.

To Printing		
Errata Slips for Prof. Fibiger	$ 2.00	
Reports of Philadelphia meeting	12.00	
Experience Circular No. 2	8.25	
Circulars for Section of Museum Technique	13.00	

Report of Washington meeting	7.50		
Announcements of London meeting	4.75		
Programmes London meeting	15.00		
Placards for London meeting	3.00	65.50	
To Typewriting		28.25	
" Postage		53.23	
" Stationery		1.12	
" Telegrams and Cables		4.02	
" Express brokerage and car tickets		5.82	
" Expenditure at Philadelphia and Washington		9.80	
" Discount on Cheques		3.90	
Total expenditure		$171.64	
Balance in hand:			
In bank	$181.02		
In cash	2.00	183.02	
Total		$354.66	$354.66

A very interesting Programme consisting of a symposium on the replies received to the Experience Circular No. II, and of papers and demonstrations on other points of *Museum and Microscopic Technique* was successfully carried out as follows:

I.

SYMPOSIUM ON REPLIES RECEIVED TO EXPERIENCE CIRCULAR NO. II.

Enquiries made by: Drs. J. G. Adami and J. C. Simpson, McGill University, Montreal; Florence Sabin, T. P. Sprunt, and M. C. Winternitz, Baltimore, Md.; S. B. Wolbach, Harvard Medical School, Boston; A. S. Warthin and G. Carl Huber, Ann Arbor, Mich.; W. G. MacCallum, New York; Louis B. Wilson, Rochester; Réné Sand, Brussels; R. M. Pearce, Philadelphia; C. F. Silvester, Princeton, N. J.

The discussions on the various questions were opened by the following replies received:

1. *Exhibit of specimens clarified by the Spalteholz Method.* (Question 3). Prof. Spalteholz, Leipzig, demonstrated an extremely beautiful series of preparations made by himself of various organs and tissues rendered transparent by a method original with him whereby the finest details of the internal structure are revealed. (For his full article see page 41 of this Bulletin).

2. *A method of staining fresh tissues by polychrome methylene blue.* (Question 7). Prof. L. B. Wilson, Rochester, Minn. (For full article see page 105 of this Bulletin).

3. *Staining of tissues growing in vitro with lantern slide demonstrations.* (Question 15). Dr. R. A. Lambert, College of Physicians and Surgeons, New York. (See page 98 of this Bulletin for full article). Prof. Aschoff inquired whether the carmine particles were actually taken up by the phagocytes. Dr. Lambert replied in the affirmative.

4. *Methods of mounting delicate material.* (Question 16). (For full article see page 45 of this Bulletin). Dr. C. F. Silvester (Princeton, New Jersey), demonstrated methods of mounting very delicate material by attaching the specimen by means of glass pins to sheets of wax.

5. *On a method of maceration preparatory to teasing.* (Question 17). A new method of maceration and teasing was given by Prof. G. C. Huber (Michigan, U. S. A.), by means of which he had been able to isolate the entire renal and seminiferous tubules. (See page 96 of this Bulletin for full paper).

6. *On a rapid method of macerating bone.* (Question 17). F. A. Izzard, Cambridge, England. (See page 144 of this Bulletin for full paper).

7. *Cement for sealing museum jars.* (Question 19). Wm. Muir and E. L. Judah, McGill University, Montreal. (See page 87 of this Bulletin for full paper).

8. *Cement for sealing rectangular museum jars.* (Question 19). William Coburn, Pittsburg, Pa. See this Bulletin.

The subject of cement for museum jars was discussed at length by *Drs. Keith, Wilson, Silvester* and others. Difficulty of obtaining a good cement that would withstand fluid was emphasized by all, and the formula given by *Muir* and *Judah* was recommended as promising the best results. *Dr. C. F. Silvester* said he had been using a cement made by Knauth Bros., 222 Fourth Ave., New York, which was the best on the market at present, but was a secret preparation and was not by any means an ideal cement. The jars sealed by this cement by himself, were still holding well, although it was beginning to change colour and to granulate along the edges now. This cement was not as colourless as it should be and was not sufficiently plastic for very large jars and might be improved upon in many other respects. He had been experimenting himself with various gums and cements for some years, and thought he had now a formula which was very good. The Arthur H. Thomas Co., of Philadelphia, was supplying him with materials and he had promised them that when he obtained a satisfactory result he would place it on the market with their house. He was at present carrying on some heat tests upon it and if the results were satisfactory, he would be very glad to submit a sample to those interested. *Mr. R. L. Frost* used simply bees-wax applied by heating the top of the museum jar to be sealed, as well as the wax. Some specimens mounted by him in this way had stood fourteen years.

II.

PAPERS AND DEMONSTRATIONS ON MUSEUM TECHNIQUE.

(*Drawn chiefly from the Section of Museum Technique of the Museum of the International Congress of Medicine.*)

MICROSCOPIC:

1. *A new rapid method for staining myelin sheaths and axis cylinders simultaneously, adapted for celloidin, paraffin, and frozen sections. With slides and lumiére potographs.* Georgine Luden van Heumen, Munich. (See page 108 of Bulletin for full paper).

2. *On the staining of cells and axis cylinders in brain material fixed in bichromic salts, and on Liesogang's method of mounting microscopic sections in gelatin.* C. U. Ariens Kappers, Amsterdam. (See page 114 of Bulletin for full paper).

3. *A simple and selective method for staining neurofibrils and axis cylinders.* Dr. Réné Sand, University of Brussels. (See page 113 of Bulletin for full paper).

These three papers presented new and valuable methods of staining the nerve cells and axis cylinders, and formed with the discussion upon them a most interesting symposium upon this subject. Dr. Kappers added that Dr. Luden's method was frequently used in the Institute for Brain Research in Amsterdam and had given very satisfactory results. He considered it a great advantage that with Dr. Luden's method not only the myelin-sheaths, but also the cells are so very well stained. In this respect it must be preferred to Pal's modification.

MACROSCOPIC:

4. *Demonstration of types of museum preparations illustrating methods of preparing and mounting specimens for exhibition purposes.*—C. F. Silvester, Princeton, N. J. (See page 45 of this Bulletin for full paper).

5. *Injection of blood and lymph vessels of young trout embryos from the time of first appearance to the time of hatching.*—C. F. Silvester, Princeton, New Jersey.

6. *Exhibit of single bacterial colonies in sealed Petri dishes as Museum preparations.*—A. A. Bruére, Royal Victoria Hospital, Montreal. (See page 121 of Bulletin).

7. *Series of Museum Jars graded to fit anatomical sizes of Organs.*—E. L. Judah, Montreal. (See page 89 for full paper.

8. *An inexpensive and effective way of mounting brain and other sections which it is desirable to view flat in the preservative mixture.*—Dr. Braxton Hicks, London.

9. *Glass construction models of brain.*—Dr. Adolph Meyer, Baltimore, showed beautiful glass reconstructions of the brain. Drawings were first made from serial sections with the Edinger Apparatus upon glass plates of uniform thickness, the outline was drawn with various coloured inks, each colour corresponding to a definite anatomical structure. The reconstruction was made by piling the plates upon each other, and the coloured lines were seen through the glass mapping out the various structures. Prof. J. T. Wilson suggested that these blocks built up of the glass plate be immersed in a fluid of high refractive index which would clear up the composite block, as a whole, and let the coloured outlines show up clearly.

10. *Series of specimens from infectious diseases, natural colours preserved, some over twenty years old, illustrating important points, as relations of various types of tuberculosis, etc.*—Prof. Sheridan Delépine, Manchester, England. (See this Bulletin, page 69).

11. *Museum specimens illustrating* (i) *the embolic origin of endocarditis,* (ii) *the difference between experimental "Streptococcus viridans" endocarditis, and experimental "Micrococcus rheumaticus" endocarditis in the rabbit, and* (iii) *experimental "rheumatic" myositis with certain strains of streptococci and muscle lesions in muscular rheumatism in man.*—E. C. Rosenow, Chicago.

12 *Corrosion injection methods.*—Prof. Wahby, Cairo, Egypt.

SPECIAL EXHIBITS.

The Section of Museum Technique of the Internationl Congress of Medicine, which was organized by the International Association of Medical Museums at the request of the Congress Museum Committee, occupied a large portion of the space devoted to the Congress Museum collections, forming one of its most impressive parts, and comprising within itself much of the finest material displayed. The second and third meetings of the International Association of Medical Museums were held in a room in direct connection with this Section, and demonstrations of the exhibits formed an important part of the proceedings. They are mentioned editorially at greater length.

SECRETARY'S INTERIM REPORT OF PROCEEDINGS FROM THE MEETING OF AUGUST 6th to 9th, 1913 TO DATE.

Organization of Italian Section. Lord Strathcona's Gift. New Members Elected.

Organization of Italian Section.—After the London Meeting, the Secretary visited the Headquarters of the "*Verein zum Austausch Anatomischer Präparate*" at the Senckenberg Institute, Frankfurt-am-Main, and Prof. Aschoff, the newly elected International President at Freiburg, where the line of development of the Association during the next three years was discussed, and the following measures were advised by the President:

(1) That organization of the sectional sub-societies should be proceeded with within the various countries, the membership to include Representatives of Pathology, Anatomy and Public Health.

(2) That representation be sought on the Council of the scientific societies representing these subjects, as has been done in the case of the German Pathological Society.

At the further suggestion of the President and with his introduction, the Secretary also visited various pathological and anatomical Institutes in Milan, Pavia, Bologna, Rome, Naples and Turin with a view to the organization of the Italian section, with satisfactory results.

Lord Strathcona's Gift of a Capital Fund, Five Thousand Dollars.—As has been mentioned editorially, this generous donation was presented without conditions to the capital funds of this Association in the following letter addressed to the Secretary:

Glencoe, Argyllshire,
26th September, 1913.

"Dear Miss Maude Abbott:—

I am not unmindful of the promise made when you and Dr. Shepherd called on me of one thousand pounds (£1,000) for the work in which you are so deeply interested, that of the International Association of Medical Museums, and my cheque for that sum, or rather for the somewhat larger amount of $5,000, (Five thousand dollars) I am enclosing herewith, being No. 156, of even date, on the Bank of Montreal, to your order, and would ask you to be good enough to place it in the hands of the Treasurer, or other proper authority. Will you kindly, at your convenience, acknowledge its receipt.

That the work will be done in the best possible way I feel well assured, and I wish you every success in the task which has been assigned to you, and which I consider to be of very great importance to the Medical Profession as well as of Canada as of Medical Museums generally.

My wife, Mr. & Mrs. Howard, and the other members of our family circle, join with me in kindest regards and every good wish, and believe me, dear Miss Abbott,

Very sincerely yours,
(Signed) STRATHCONA."

Miss Maude Abbott, M.D.,
McGill University, Montreal, Canada.

With the approval of the International President and other members of the Council, this money was immediately paid into the trustees of McGill University to be held in trust by them, and invested for the Association at a half yearly rate of interest, and on the understanding that is should be refunded at the demand of the Association. The following letter of acknowledgement is held in duplicate by the Secretary and by the International President:

McGILL UNIVERSITY,
Montreal.

Secretary and Bursar's Office.

October 16th, 1913.

Dr. Maude E. Abbott,
Medical Museum.

Dear Dr. Abbott:—

I have pleasure in enclosing a formal receipt for the sum of $5,000 which you have this day handed me, being a gift by Lord Strathcona to the International Association of Medical Museums. The University undertakes to receive and, as soon as possible, to invest this sum and semi-annually to pay the interest derived from such investment to the order of the Treasurer of the International Association and the Dean of the Medical Faculty of McGill University. The University will also transfer and pay over the principal sum on the demand of the International Association of Medical Museums.

Yours very truly,
(Signed) W. Vaughan,
Secretary.

On January 21st, 1914, Lord Strathcona ended his honored life in his 93rd year. A fortnight later the announcement of his generous benefaction was circulated among the members.

Election of New Members by the Written Vote.

The following new members were elected by the written vote, taken by the Secretary on March 3rd, and July 14th, 1914:

BELGIUM

Prof. L. Bertrand, Antwerp.

DENMARK

Prof. V. Ellermann, Medical Jurisprudence, University of Copenhagen; Prof. A. F. Folger, Pathological Anatomy, Veterinary High School, Copenhagen; Prof. C. O. Jensen, Director of Serum Institute, Veterinary High School; Prof. T. H. Nadsden, Director of Serum Institute of State of Denmark; Dr. L. Melchier, Prosector of Communal Hospital of Copenhagen; Prof. Paulli, Normal Anatomy, Royal Veterinary High School; Prof. C. J. Salomonson, Pathology, University of Copenhagen.

ENGLAND

Sir Thomas Barlow; Dr. Armit, Mr. H. S. Wellcome, and Prof. F. Wood Jones, London; Mr. R. L. Frost, Sheffield; Mr. M. Hamilton, University College, London.

GERMANY AND AUSTRIA

Adelheim, Dr. R., Städtisches Krankenhaus, Riga; Albrecht, Prof. Dr. H., Graz; Bostroem, Geheimrath Prof. Dr., Giessen; Dürck, Prof. H., München; Aber, Prof. Dr., Veterinäro-Institut, Leipzig; Ernst, Prof. Dr. P., Patholog. Institut, Heidelberg; Funncius, Dr. B., Städt. Krankenanstalten, Eberfield; Ghon, Prof. Dr. A., Prag; Joannovicz, Dr. Gg., Wien; Kitt, Prof. Dr., Tierärztlichen Hochschule, München; Krompecher, Prof. Dr. E., Budapest; Loehlein, Prof. Dr. M., Patholog. Institut, Charlottenburg-Westend; Maresch, Dr. R., Prosektor am Rudolfspital, Wein; Meyer, Prof. Dr. R., Universitäts Frauenklinik, Berlin; Mönckeberg, Prof. Dr. J. G., Akademie f. Medicin, Dusseldorf; Paskzkiewicz, Dr. L., Städt-Krankenhaus Praga, Warschau; Raubitschek, Dr., Czernowitz; Reinhardt, Dr. A., Leipzig; Risel, Prof. Dr. W., Zittau; da Rocha-lima, Dr. H., Institut f. Tropenkrankheiten, Hamburg; Rössle, Prof. Dr. H., Jena; Schmidt, Prof. Dr. M. B., Würzburg; Schwalbe, Prof. Dr. E., Rostock; Steinbiss, Dr., Bielefeld-Bethel; Wehrsig, Dr., Städtisches Prosektur, Aachen; Wolhardt, Prof. Dr. D., Städtisches Krankenhaus, Mannheim; Zieler, Prof. Dr., Dermatologisches Klinik, Würzburg.

ITALY

Prof. A. Banti, Firenze; Prof. F. Foa, Torine; Prof. E. Marchiafave, Roma; Prof. L. Devoto, Milane; Drs. R. Veratti and F. Zanotti, Bologna; Prof. Guilio Tarozzi, Modena; Prof. Guido Guerrini, Milane; Prof. Ettere Ravenna, Modena; Prof. Binda DeVecchi, Bologna.

SWITZERLAND

Profs. Kolle, Wegelin and Hugeinin, Bern; Laskowski, Eternod and Cristiani, Geneva; Beityke, Lausanne; Felix, Zurich.

(In the case of Switzerland the usual custom had been deviated from in that 32 names proposed by Prof. M. Askanazy were circulated without having previously obtained the consent of their owners. This was done because of special circumstances which made it necessary to avoid the loss of time required by the foreign correspondence. All the Swiss members proposed were elected, but only those who subsequently accepted their Membership are inscribed above).

UNITED STATES AND CANADA

Prof. R. Minot, Anatomy, Harvard Medical School, Boston, Mass.; Dr. W. Curtis Brigham, Los Angeles, Cal.; O. S. Hillman, Post Graduate School, New York, N. Y.; Prof. A. C. Geddes and Dr. A. H. MacCordick, McGill University; Prof. E. Latreille and A. Vallée, Dr. St. Pierre, Laval University, Montreal, and Dr. G. Baehr, Mount Sinai Hospital, N. Y.; Prof. Harvey Cushing, Harvard Medical School, Boston, Mass.; Dr. T. S. Cullen, Johns Hopkins Hospital, Baltimore, Md.; Dr. H. H. Donaldson, and Dr. M. Greenman, Wistar Institute, Philadelphia; Dr. D. H. Dolley, Univ. of Missouri, Columbia, Mo.; Prof. G. Fitzgerald, Hygiene, and Prof. A. McMurrich, Anatomy, University of Toronto, Toronto, Ont.; Dr. C. Z. Garside, Fordham University, New York, N. Y.; Dr. S. R. Haythorn, Alleghany Hospital, Pittsburg, Pa.; Prof. Howard Karsner, Harvard Medical School, Boston, Mass.; Dr. J. A. Kolmer, Univ. of Pennsylvania, Philadelphia; Dr. H. H. Kingsford, Dartmouth Med. School, Hanover, N. H.; Dr. R. H. Malone, McGill University, Montreal, Canada; Prof. W. H. Manwaring, Leland Stanford Univ., Cal.; Dr. Veranus A. Moore, Ithaca, N. Y.; Dr. Chas. Norris, Bellevue Hospital, N. Y.; Dr. S. J. Peirce, General Hospital, Winnipeg, Canada; Dr. A. C. Rankin, Univ. of Alberta, Edmonton, Alta; Dr. S. W. Sappington, 134 S. 16th St., Philadelphia; Dr. W. G. Weiskotton, Medical School, Syracuse, N. Y.; Dr. H. G. Wells, Univ. of Chicago, Ill.; Dr. Hans Zinsser, College of Physicians & Surgeons, N. Y.

The written vote of the International membership was taken by the Secretary on July 14th, 1914, upon the following amendment to Article II, paragraph I, of the Constitution, "The membership shall be elective and international in Scope," etc., *Members may be elected at the International Meetings, or in the interim of the Meetings, by the Local Section of that Country to which they belong.* The vote was returned unanimously in the affirmative with one exception, and the amendment was therefore carried.

REPORT OF THE FIRST STATED MEETING

OF THE AMERICAN SECTION OF THE

INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

The first meeting of the American Section of the International Association of Medical Museums was held on Thursday, April 9th, 1914, in the New Pathological Building of Toronto University, the President of the American Section, Prof. R. M. Pearce of Philadelphia in the Chair. There were present Drs. Harvey, Gaylord and Herbert Williams, Buffalo; E. R. LeCount, Gideon Wells, W. N. Bissell and A. M. Moody, Chicago; H. E. Robertson and E. T. Bell, Minneapolis; Leo Loeb, St. Louis; E. Libman, Geo. Baehr and O. Hillman, New York; Sydney J. Peirce, Winnipeg; J. J. McKenzie, A. McMurrich and J. G. Fitzgerald, Toronto; O. Klotz and J. R. Haythorn, Pittsburg; H. S. Steensland and H. G. Weiskotten, Syracuse; Howard Karsner, Boston; J. H. Hewitt, Cleveland; W. T. Connell, Kingston; E. L. Judah, M. E. Abbott of Montreal and others.

The President requested that the meeting be put in order before business was proceeded with by ratifying the election of the officers of the American Section who had been appointed by the American and Canadian Members present at the International Meeting of the Association in London on Aug. 6th, 1913, as follows:

President—Prof. R. M. Pearce.
First Vice-President—Prof. A. S. Warthin.
Second Vice-President—Dr. C. F. Silvester.
Third Vice-President—Prof. F. J. Shepherd.
Councillors—Prof. W. G. MacCallum, Prof. Leo Loeb, Prof. Oskar Klotz.
Secretary-Treasurer—Dr. Maude E. Abbott.
Assistant Secretaries—Dr. J. Kaufmann, Dr. W. Francis.

The election was ratified.

Owing to the fact that this was the first meeting of the American Section as a formally inaugurated Sectional body, there were no minutes, those from the International Meeting at Philadelphia in 1912 having been submitted to the succeeding International Meeting in London, in August, 1913, and the minutes of the latter meeting being reserved for the International Meeting

Medicine at Munich in 1917. The Secretary was therefore called to be held in conjunction with the International Congress of upon for a short report of proceedings since the meeting of April 1st, 1912.

The Secretary's Report covered the International Meeting in Philadelphia in April, 1912, the special business meeting of the American and Canadian Members held at Washington on May 5th, 1913, to make arrangements for the London Meeting in August, 1913, the organization of the section of *Museum Technique* of the Museum of the International Congress of Medicine, the proceedings of the London meeting of August 6th to 9th, 1913, the organization of the Italian Section, and the generous gift of five thousand dollars ($5,000.00) to the capital funds of the Association received from Lord Strathcona on October 23rd, 1913.

The Secretary's report was adopted.

It was resolved that the recommendation of Prof. Aschoff be acted upon to the effect that a propaganda for increased membership be immediately carried out in the various countries.

The following financial statement of the International Funds from August 1st, 1913 to April 1st, 1914 was submitted:

FINANCIAL STATEMENT, AUGUST 1, 1913, TO APRIL, 1914.

Cr.

Aug. 1, 1913:		
Balance on hand:		
In bank	$182.12	
Cash in hand	.90	$183.02
Aug. 7 to 12:		
Received in London (Members fees), £7.17.6		23.85
Sept., Oct., 1913: Members' Fees, Folio 52	$11.20	
Nov. 13—Feb. 24, " " " 54	36.60	
Mar. 10-18, " " " 56	37.00	
Mar. 23—April 2, " " " 58	39.96	
April 3-6, " " " 60	22.06	146.82
Nov. 30, 1913: Interest in Bank		2.64
Mar. 2, 1914:: : Revenue from Strathcona Fund		150.00
		$506.33

Dr.

Aug. 1-13, to Apr. 9-14: Miscellaneous expenses, stamps, printing, etc.		$ 91.24
Aug. 7-12, 1913: Expenditure at London meeting, £3		14.61
Mar. 2, 1914: Ann Arbor Press, Bull. IV		300.15
Apr. 9, 1914: Bank charges to date		3.61
		$409.61
In Bank	$88.68	
In Cash	8.04	$ 96.72
		$506.33

Moved by Dr. Coplin, seconded by Dr. Robertson that this financial statement be accepted as an ad-interim report, and that the Treasurer be instructed to present a complete financial statement of the expenditure since the origin of the Association at the next annual meeting of the American Section.

A discussion on the expenses of the American Section followed, and it was pointed out that the funds of the International Society could not properly be applied to these, and that a special fee would be necessary.

Moved by Dr. Coplin that this matter be referred to the Council for a report.

The Secretary stated that the authority of the Society was necessary in order to place the trust account which had been opened at the bank of British North America of Montreal in the name of the Society. Formal authorization was given to this effect.

The matter of closer affiliation with other Scientific Societies was discussed, and it was resolved to seek representation on the Council of the Association of Pathologists and Bacteriologists, and the new Society of Experimental Pathology. Dr. Coplin moved that the President be allowed to appoint a representative on these societies. Prof. Leo Loeb was appointed representative on the Society of Experimental Pathology, and Prof. LeCount on the Council of the Association of Pathologists and Bacteriologists.

The annual election of officers took place and resulted in the reelection of those elected at the London meeting of 1914, with the addition of Prof. H. E. Robertson and Prof. W. M. L. Coplin on the Council.

A letter was received from the *"Union Associations Internationales,"* Brussels, inviting this Association to hold a session at the coming Panama-Pacific International Exposition, and also to send a delegate to the World Congress of International Association to be held at San Francisco, Cal., in 1915. This matter was referred to the President, to act jointly with Prof. Ophuls.

The following PROGRAMME was carried out:

MUSEUM RESEARCH:

1. *Remarks on the American Bureau for the Preservation of Results of Original Research.*—Leo Loeb, M.D., St. Louis, Mo.

Prof. Loeb defined the functions of the proposed Bureau for the preservation of the results of original research which the Committee appointed for this purpose had decided to establish at McGill University, Montreal, as follows:

(1) The preservation of rare specimens, which might otherwise be lost. (2) The opportunity afforded to others interested along the same lines to study the steps of an original investigation, and to themselves confirm the findings recorded. (3) The centralization of collections; thus pathological lesions which might be distributed under various investigators might be brought together, contradictory findings might be compared, and kept together for comparison by all students. (4) The preservation for others of large collections of specimens which are valuable in themselves, but which may have lost interest and value to the original observer, after he has passed to another form of work.

Anatomists such as Profs. Minot and Mall, are doing just this work at the present time along their own lines. The successful operation of such a Bureau would mean much work for its Curator and it would be necessary to know what recent work is of sufficient value to warrant the preservation of its original material. *Dr. Abbott* said that this might be arranged by organizing a reporting system among the Teaching Staff of the University where the collection was placed, and submitted proposed invitation blanks and receipt forms.

2. *On the use of Ordinary Card Index Drawer for filing microscopic sections.*—J. J. MacKenzie, M.D., Toronto.

Dr. Karsner remarked that this method was used also in the Boston City Hospital.

3. *Pasteboard blanks and cover for Card Index File and Permanent Mounting of microscopic sections.*—W. M. L. Coplin, Philadelphia.

By this method the slides are filed singly, clear of paper to avoid soiling with immersion oil, and their history filed with them.

4. *Public service in the University as a means of aiding Medical Research.*—J. G. Fitzgerald, M.D., Winnipeg. (See this Bulletin, page 28).

5. *Laboratory and Hospital of the State Institute for the study of malignant disease, Buffalo, N. Y., with plans for the proposed Biological Station (Lantern Slide Demonstration).*—Harvey Gaylord, M.D., Buffalo, N. Y.

This constituted a very complete presentation of an ideal biological station.

MUSEUM TEACHING:

6. *The experimental method as utilized in the Clinico-pathological Conference.*—Howard T. Karsner, M.D., Boston. (See this Bulletin, page 34).

Discussed by Drs. Coplin, Robertson and Pearce, who said that the antivivisectionist reproach must be guarded against, especially in this connection.

7. *The Public Health Museum, its possibilities and uses.*—H. E. Robertson, M.D., Minneapolis. (See this Bulletin, page 30).

In the discussion Dr. Coplin said the Public Health Museum was one of the most important functions of this Association. He had seen the Public Health exhibit in Dresden in 1907 and was much impressed with the emphasis laid upon it by the German Government in the instruction of school children, who were given free transportation from and to all parts of the country for the purpose of seeing and studying the exhibits. He felt strongly the importance of beginning hygienic and sanitary education young. He had been much impressed by an exhibit from Algiers. Every State and Government taking up good things should undertake this, it is especially needed by teachers. *Dr. Fitzgerald* had also seen the exhibits of Dresden. He considered that such Public Health Museums should be Municipal or State products, rather than from the University, and thought they should be undertaken and controlled by the State. *Dr. Robertson* said that a public appeal should be made for this work. The popularization of Medicine and all its branches is a very valuable aid in many ways and constitutes the best counter antivivisection movement possible. He still thought that the University and not the State should take the lead in this matter. Dr. Coplin referred to the milk exhibits in Philadelphia which resulted in two years in revolutionizing the whole system of milk inspection.

8. *Compact method of mounting serial collections of organs for clinical teaching.*—L. J. Rhea, M.D., Montreal.

MUSEUM METHODS:

9. *Note on the following items:*—
(1) Exhibition refrigerator in Medical Museums: cold storage applied to Museums; (2) Shelfless museum case: special exhibition or demonstration cases; (3) Felt dust-proofing of museum cases; (4) Bone mounts and label holders; (5) Label holders; (6) Holder for wall exhibition of pictures, of Petri-dish gelatin mounts, of clock-glass mounts, etc.; (7) Jar holders; (8) Support for tall narrow jars used in demonstrations; (9) Model metal pans with attachable card holder for exhibition of wet specimens; (10) Glass beads for indicating different fluids in which specimens are preserved; (11) Glass pins as indicators on specimens; (12) Aluminum numbers and punched parchment numbers for attachment to specimens; (13) Museum truck with rubber surfaced shelves; (14) Plain and prismatic floor lights for balconies; (15) Metal roll top desk for laboratories; (16) Special easel.—W. M. L. Coplin, M.D., Philadelphia.

10. *Note on:*—
(1) Label holders; (2) Glass pins marking out pathological lesion; (3) Tray for carrying specimens on truck with rubber castors.—E. L. Judah, Montreal.

MACROSCOPIC TECHNIQUE:

11. *Simplified Technique for Preservation of Colours by Formalin-Chloral Hydrate.*—Sydney J. Peirce, M.D., Winnipeg. (See this Bulletin, page 68).

12. *A Modified Jores Method for the Preservation of Colours in Gross Specimens.*—Oskar Klotz, M.D., and W. W. G. Maclachlan, Pittsburgh. (See this Bulletin, page 59).

13. *Staining Pathological Specimens in the Gross (with demonstration).*—Oskar Klotz, M.D., Pittsburgh. (See this Bulletin, page 51).

14. *A new Colour Method for Preparing Gross Specimens.*—R. H. Malone, M.D. and L. Heddick, Montreal. (See this Bulletin, page 53).

15. *Rapid Colour Method for Differentiation of Fat in Gross Specimens.*—J. Kaufmann and E. L. Judah, Montreal.
16. *India-Ink Injection of Bursal Spaces of Heart, showing distribution of auriculo-ventricular bundle.*—J. Kaufmann, Montreal. (See this Bulletin, page 50).
17. *Reconstruction of cavities of Heart and Aortic Arches from Pig Embryo of* 4.4 *mm.*—Prof. Minot and Mr. A. E. Meyers, Boston.

Microscopic Technique:

18. *Exhibit, photographic and microscopic, from the Department of Tropical Medicine, Harvard, relating to Infectious Diseases in South America.*—R. P. Strong, M.D., Boston.
19. *Special Stain showing minute Surface-dwelling Coccidium in Mouse.*—Dr. Tyzzer, Boston.
20. *On the Technique of Rapid Diagnosis by Frozen Sections.*—Sydney J. Peirce, M.D., Winnipeg. (See this Bulletin, page 106).
21. *Vital Staining.*—Lydia de Witt. (See this Bulletin, page 100).

REPORT OF THE SECOND MEETING OF THE AMERICAN SECTION, APRIL 1st, 1915.

The second meeting of the American Section of the International Association of Medical Museums took place on Thursday, April 1st, 1915, at 9:30 a. m. and 2:30 p. m., in the Department of Pathology, Washington University Medical School, St. Louis, Mo. In the absence of the President of the American Section, Prof. R. M. Pearce, the Chair was taken by Prof. A. S. Warthin. Ann Arbor, Mich., First Vice-President. There were present Drs. W. M. L. Coplin, E. L. Opie, Henry Albert, D. L. Harris, Paul T. Woolley, H. S. Bernstein, Carl V. Weller, Georgine Luden, Lydia de Witt, Gideon Wells, P. F. Morse, R. J. Terry, W. W. G. Maclachlan, Ralph Thompson, Thomas, Souchon, Holman, Evans, Tyzzer, Maude E. Abbott and others.

The Secretary's report including minutes of the previous meeting and account of proceedings since was submitted and adopted.

The written vote of the International membership was taken by the Secretary on July 14th, 1914, upon the following amendment to Article II, Paragraph I, of the Constitution, "The membership shall be elective and international in scope," etc., *Mem-*

bers may be elected at the International Meetings, or in the interim of the Meetings, by the Local Section of that Country to which they belong. The vote was returned unanimously in the affirmative with one exception, and the amendment was therefore carried. The President submitted this amendment to the Constitution to the Meeting of the American Section and it was declared an integral part of the Constitution.

The following new members of the International Association of Medical Museums were then elected by this meeting of the American Section: Prof. C. H. Bunting, Madison, Wis.; Prof. F. B. Mallory, Boston, Mass.; Dr. Randle C. Rosenberger, Philadelphia, Pa.; Prof. John Sundwall, Lawrence, Kansas; Dr. Carl V. Weller, Ann Arbor, Mich.; Dr. Plinn Morse, Detroit, Mich.; Dr. J. R. Terry, St. Louis, Mo.; and Dr. Horst Oertel, Montreal, Canada.

The Secretary submitted the following financial statement of the International Association for the year ending April 1st, 1915, and also the statement of the expenditure incurred by the American Section for which there were as yet no funds in hand.

INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

Financial Statement from April 9th, 1914 *to April 1st,* 1915.

Cr.

Balance on hand		$ 96.72
Received in Members' fees and sale of Bulletin	$233.58	
Interest on Strathcona Fund, Feb. 3rd, 1915	125.00	
Bank interest to date	3.87	$362.45
Total		$459.17

Dr.

Miscellaneous expenditures on stamps, typing, express charges, telegrams, and printing	$ 54.35	
Bank charges on Cheques	7.61	
In Bank	$390.12	
Cash in hand	7.09	$397.21
Total		$450.17

Financial Statement of American Section of the International Association of Medical Museums, from April 9th, 1914, *to April 1st,* 1915. (*Funds loaned by the Committee of this Section as none are available.*)

Dr.

Expenditure on print and postage for meeting of American Section of April 9th, 1914	$ 22.10
Of April 1st, 1915	17.50
Total	$ 30.60

This statement was accepted, but it was moved, seconded and resolved that the Accounts of the International Association since its organization in 1907 be audited, and that Dr. W. M. L. Coplin and Dr. H. Albert be appointed the official auditors for this purpose. Carried.

The following resolution having been published on the programme under the name of the President, Prof. R. M. Pearce, was recommended from the Council: *That on account of the War the membership fee for the year 1915 be levied from the members resident in America only, and be remitted in the case of other nationalities, and that this fee be applied to the expenses attendant upon the meetings of the American Section; also that in future a fee of 50 cts. per annum, in addition to the International fee of $2.00, be levied from the American Members, this additional fee to be applied to the American Section.* Carried.

The Secretary was instructed to open a second bank account for the funds of the American Section.

A discussion upon standardizing sizes of Museum jars was introduced by Dr. Coplin who explained that the manufacturers of these were confused and much expense was incurred by the slight and immaterial variations in the sizes of the jars ordered by the different Museums, the variation amounting sometimes only to a single centimeter. This was well seen in the list of sizes of jars used by the Medical Museum of McGill University, in which 53 sizes were employed, and the Museum of the Jefferson Medical College in which 60 sizes were used. The number of sizes could probably be reduced to 50 or less by cooperation. The Arthur H. Thomas Company had written promising their cooperation, if action could be taken by the various Museums through the Association in this matter. Dr. Coplin therefore moved: That a Committee of three or five members be appointed, at the discretion of the President; to consider and make recommendations upon the sizes of jars to be used in general Museum work. Seconded by Dr. E. L. Opie, and carried. Dr. Coplin of Philadelphia, Mr. E. L. Judah of McGill University and Dr. Ralph Thompson of St. Louis, were appointed to constitute this Committee, and were instructed to prepare a list of standard sizes for publication in the next Bulletin.

The following programme was presented:

(The papers of absent members, except in cases where illustrative material had been sent, were read by title).

MUSEUM TECHNIQUE:

1. *On the Preservation of War Material for Museum Purposes.*—J. G. Adami, M.D., Montreal. (See page 63 of this Bulletin).
2. *Tank Storage of Museum Material.*—W. M. L. Coplin, M.D., Philadelphia. Discussed by Prof. E. L. Opie and Prof. H. Albert.
3. *The Advantages of Jores' fluid, as modified by Klotz, for preserving organs for teaching demonstrations.*—J. H. Hewitt, M.D., Cleveland.
4. *Comparative Series showing Specimens preserved*: (*a*) *by the Method of Kaiserling;* (*b*) *by Jores' Method, modified by Klotz.*—E. L. Judah, Montreal.
5. *An efficient inexpensive mounting fluid for gross specimens.* —S. Haythorn, M.D., Pittsburg. (See page 66 of this Bulletin).

This paper, which presented a combination of the methods of Klotz and Maclachlan with those of Delépine and Frost was presented by Dr. Maclachlan. In the discussion following, *Dr. Coplin* inquired whether any alcohol was used in the fixative process in Klotz, modification of Jores' method. *Dr. Albert* asked whether the colours preserved by this method fade on exposure to light with time, and Dr. Abbott questioned the quality of the red colour, which in specimens put through by Mr. Judah under careful control and done simultaneously with the comparative series of Kaiserling specimens showed a much brighter and different red from the ordinary red of the oxyhæmoglobin of the blood. *Dr. Maclachlan* replied, that alcohol was not used in this method of preservation, that the colours were not found to fade on exposure to light, and that the red obtained by this method was of a somewhat different character and of a brighter colour than the red of the body tissues, but this was surely a fault in the right direction. All material in Dr. Klotz' Laboratory was put through this solution and the results were found most satisfactory for teaching purposes and for permanent museum preservation.

6. *Delépine's Arsenic-glycerin-jelly Method of Preserving Gross Specimens.*—C. E. Royce, M.D., Iowa City. (See page 76 of this Bulletin.

In discussion *Dr. Coplin* said he had been up against the gelatin proposition for some twelve years, the results were very uncertain owing partly to the different qualities of gelatin on the market; he had twenty different packets of gelatin in his storeroom of varying quality. Some change in colour with time, while others do not. His conclusion was that the gelatin methods are very satisfactory in themselves, provided that a perfectly good gelatin can be obtained commercially. *Dr. Terry* inquired whether large cross sections of the body could be mounted as gelatin preparations in this way. *Dr. Coplin* remarked that one of the nicest ways of mounting thick sections, was to take a large thick piece of glass, mount a slice in gelatin in a petri dish upon it and place the whole in a larger inverted Petri dish which is filled with cotton, which thus serves to press the section contained in the smaller Petri dish against the glass. He believed that nothing else would permanently bind together two pieces of glass with gelatin between them, in the humidity of our heating system here. *Dr. Royce* replied, that large cross sections of the body could be mounted in gelatin and the plates sealed by gutta percha tissue covered by adhesive plaster.

7. *Rapid Maceration of Bone.*—E. L. Judah, Montreal.

A rabbit skeleton was shown which had been rapidly macerated in caustic potash for a period of 5 to 10 minutes. It showed complete cleansing of the bone from every particle of flesh, and freedom from fat. *Dr. Coplin* remarked that the value of this method could not be pronounced upon until 10 years had elapsed, as it was well known that such rapid procedures frequently led to later crumbling and dessication of the bone.

8. *Experience in the use of Gelatin in Mounting Anatomical Preparations.*—R. J. Terry, M.D., St. Louis. (See page 73 of this Bulletin).

Very beautiful anatomical preparation were shown. In these the bodies had been fixed by injecting with 10% formalin, and gelatin had been used for holding structures in position after careful dissection, or for distending hollow viscera. A thin sheet of gelatin was spread over the dissected parts which were thus held in position by an invisible layer. Bodies lying free in a cavity, such as calculi, were shown fixed in situ.

9. *Use of Plaster Paris for the Mounting and Framing of Museum Specimens.*—C. E. Royce, M.D., Iowa City. (See page 80 of this Bulletin).

Both plaster Paris mount and the wooden frame in which these were made were exhibited. The simplicity of the method and the strength and permanence of the mount were much appreciated.

Dr. Albert suggested hardening of the casts by alum solution. *Dr. Warthin* thought paraffin might be introduced, as art casts are soaked in paraffin. Dr. Coplin suggested the use of beeswax and thought also that some of the ordinary methods of hardening art casts might be used. *Dr. Warthin* used plaster of Paris to back gelatin plates with success. The varying climate in America made the laboratory question an individual one.

10. *On the Demonstration of Micro-Chemical Reactions in Museum Specimens.*—A. S. Warthin, M.D., Ann Arbor. (See page 56 of this Bulletin).

The micro-chemical reactions were described as applied in the preparation of museum specimens in a variety of conditions. Thus ferrocyanid of potassium and hydrochloride acid gave a bright Prussian blue reaction in haemosiderosis of pernicious anemia, or haemochromatosis or haemorrhage in the tissues. The black reaction from ammonium sulphide also showed well in these cases, especially in haemochromatosis or the blood extravasation of large aneurisms, ectopic pregnancy, borders of haematomata, etc. A second group was the bright scarlet reactions of fat with Sudan III and Scharlach R. These fade in bright sunlight after a few years. This method was useful in the study of aortas especially in infectious cases, and fatty elephantiasis, and the infiltration of fatty tumours is well seen. Thirdly, a deposit of lime salts could be well studied by von Kossa's method. Calcified translucent preparations had been seen in Schmorl's Laboratory which were extremely instructive. The fourth group of colour reactions were obtained in amyloid degeneration. Unfortunately most of these were not permanent, especially that by iodine. More lasting results were obtained by a 20% solution of gentian violet, decolourizing with 2% alcohol and counterstaining with Bismarck brown. Such methods could be multiplied in many ways.

This paper was discussed by *Drs. Albert, Coplin,* and *Maclachlan. Dr. Coplin* said the iodine reaction for amyloid might be best preserved by imbedding in glass wool. Tissues treated for haemosiderosis should be first fixed. A good method showing the Sudan III reaction was to mount another portion of the same tissue preserved in the ordinary way in the same jar. *Dr. Maclachlan* said that Dr. Klotz had used the Sudan III for 2½ years and had presented his results before this Society last year. He remarked that fat necrosis could be well shown up by treatment with copper sulphate. *Dr. Warthin* said that he had used Scharlach R ten years ago when this chemical was first discovered, and that fat embolism of the lung could be shown by it in an exceptionally fine way.

11. *A Method for Permanent Exhibition of Macroscopic and Microscopic Tissues, Mounted between Glass Plates.*—J. H. Hewitt, M.D., Cleveland.

MICROSCOPIC TECHNIQUE:

12. *The Staining of Spirochaetes in Tissues, Lantern Demonstration.*—S. B. Wolbach, M.D., Boston.

The Spirochaetes were stained by the Giemsa method. *Dr. Warthin* said he greatly preferred the Levaditi method because the organisms are much more sharply defined. The spirochaetes in the liver of congenital syphilis disappear after the tissue has been cold for some hours. *Dr. Morse* inquired whether there was any stage in the life history of the spirochaetes when they take the Giemsa stain, and *Dr. Wells* inquired why the staining power of the spirochaetes is retained in macerated placentas. Dr. Wolbach used wet fixation altogether.

13. *Lantern Slide Demonstration on a Case of Haemochromatosis.*—Georgine Luden, M.D., Mayo Clinic, Rochester.

Discussed by Drs. Opie, Warthin, and Abbott.

This case was presented because of its diversity of histologic findings. The writer stated that haemochromatosis appeared to be the result of haemolysis caused by malignant degeneration in histologically widely different tissues. The thyroid, parathyroids, liver, stomach, spleen, pancreas, adrenals and ovaries contained carcinomatous changes of their own cells. The uterus contained leiomyoma, sarcomatous areas, and areas of adenocarcinoma showing intense proliferation. In the kidney, metastases of thyroid carcinoma, uterine gland (adeno-carcinoma) and Wolffian rests were found. The scientific interest of the case centered in the fact that it contains (1) metastases of different origin in the kidney besides embryonic rests, (2) apparent evidence of a general basis for malignant growth, and (3) a peculiar pathologic fibroblast that had also led to the tracing of malignant conditions in other cases. Attention was also called to the fact that "haemolysis" is a recognized attribute of malignant cells and that the patient's mother had died of cancer.

14. *The Demonstration of Blastomycetes in the Tissues with a Note on Morphology.*—H. W. Wade, M.D., New Orleans.

Discussed by *Dr. Warthin*, who said that he had used many differential stains but preferred a good haemotoxylin and eosin stain, and examining afterwards with a yellow light. No other disease illustrated the phagocytic nature of the giant cells so well as this. Cases were becoming very numerous in the neighborhood of Chicago and in Michigan.

ILLUSTRATIVE MEDICAL TEACHING:

15. *The Simultaneous Study of Gross and Microscopic Appearances in the Study of Pathology.*—Henry Albert, M.D., Iowa City.

Considerable discussion followed by *Drs. Gideon Wells, Warthin, Morse* and *Opie*. The importance of educating the student's powers of observation by the use of drawing from the specimens was emphasized and the difficulty of obtaining sufficient time for this in the number of hours usually devoted in the curriculum of the study of Pathology.

16. *Demonstration of Large Mounted Sections to be used as Lantern Slides.*—Carl V. Weller, M.D., Ann Arbor. (See page 46 of this Bulletin).

Some of the best preparations of the meeting were shown. The method was discussed by *Drs. Albert, Royce,* and *Coplin.* In reply to an inquiry by Dr. Royce, Dr. Weller said that the microtom used in cutting his sections was the ordinary Schanze and the size of block was 1" square by ½" thick.

17. *Demonstration of Hearts showing Hypertrophy and Dilatation of Chambers in Fixation by Wollhard's Method.*—J. C. Meakins, M.D., Montreal. See this Bulletin.

18. *India-Ink injection of Auriculo-ventricular Bundle of His, and Counter-Staining of Tissues by Sudan III.*—J. Kaufmann, M.D., Montreal.

19. *Museum Display Refrigerator, Expense of.*—W. M. L. Coplin, M.D., Philadelphia.

The interesting feature of this refrigerator was the use made by Dr. Coplin of his special label holders which were attached to the outside of the jar in any position required and permitted the insertion of the label or pointer directed towards the area of the specimen described.

MUSEUM RESEARCH:

20. *Lantern Slide Demonstration on the Differentiation of Two Forms of Congenital Dextrocardia.*—M. E. Abbott, M.D., and J. C. Meakins, M.D., Montreal.

21. *Demonstration of Two Rare Cardiac Malformations.*—Carl V. Weller, M.D., Ann Arbor, Mich.
22. *Demonstration of Rare Cardiac Anomaly.*—S. B. Wolbach, M.D., Boston.
23. *Two Cases of Patent Foramen Ovale.*—M. E. Abbott, M.D., Montreal.

The four latter papers formed an interesting symposium on Congenital Cardiac Disease which are reported in full in Bulletin V.

SPECIAL EXHIBITS:

24. *Series of Specimens illustrating General Pathology of Bone, with Demonstrations.*—Eugene L. Opie, M.D., St. Louis, Mo.
25. *Medico-Legal Exhibit, (with Demonstration) Illustrating Especially the Effects of Poisons, Accident, and Various Forms of Sudden Death.*—Ralph L. Thompson, M.D., St. Louis, Mo.
26. *Crania from Indian Mounds in Neighborhood of Saint Louis,* —R. J. Terry, M.D., St. Louis, Mo.
27. *Exhibit of a Specimen Mounted between Glass Plates to Demonstrate the Macroscopic and Microscopic Picture.*—J. H. Hewitt, M.D., Cleveland.
28. *Gumma of Myocardium, Syphilitic Aortitis, and Aneurism of Sinus of Valsalva in a case with complete Heart-block and Electrocardiogram.*—L. J. Rhea, M.D., Montreal.
29. *Gumma of Myocardium, Syphilitic Aortitis, Multiple Aneurisms of Aortic Valves.*—M. M. Abbott, M.D., Montreal.
30. *Descriptive Catalogue of McGill University, Vol. IV, Section I.*—M. E. Abbott, M.D., and O. C. Gruner, M.D.

CONSTITUTION AND BY-LAWS OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

AMENDED AUGUST 6, 1913.

ARTICLE I.—NAME AND OBJECTS.

This Association shall be called The International Association of Medical Museums. It shall have as its objects:

1. The promotion in a general way of the efficiency of the Medical Museum as a compendium of scientific facts, a store-house of material for, and of the results of research, and as a medium for teaching.
2. Discussion of plans of cataloguing and classification, and methods for the preparation and preservation of specimens.
3. Arrangements for the interchange of specimens and for the specialization of certain museums along particular lines in which they may enjoy the best facilities.
4. The publication of a Medical Museum Bulletin, which shall aim at the furtherance of the above objects.
5. The consideration of the feasibility of establishing an Index Pathologicus in the future.
6. The establishment of central bureaus in various countries for the preservation of the results of original research and for the exchange of material.

ARTICLE II.—INTERNATIONAL MEMBERSHIP.

The membership shall be elective, and shall be international in scope, including representatives of the leading medical museums throughout the world.

All persons actively engaged in, or interested in, the work of medical museums may become active members on election and the payment of $2 per annum.

Members may be elected at the International meetings or in the interim of the meetings, by the local Section of that country to which they belong.

Only those persons officially accredited to a medical museum as its representative may vote.

Persons distinguished for eminent services to science and especially to the cause of museums and of this Association, may be made honorary members.

ARTICLE III.—INTERNATIONAL FEES.

There shall be an admission fee of $2, payable by active members immediately on their election, and an annual fee of $2, payable in advance on January 1st of each year, and falling due the year after election.

ARTICLE IV.—International Officers.

The International Officers shall be a President, three Vice-Presidents, a Secretary-Treasurer, and as many Councillors as there are countries represented in the Association, one Councillor for each country; these Officers shall together constitute an executive committee. They shall be elected triennially at the international meeting for the ensuing triennium and for the next international meeting, except the Secretary, whose position shall be permanent. The President shall, whenever possible, be elected from that country where the next international meeting will be held.

ARTICLE V.—Of the Sectional Societies.

1. There shall be a central international body with international officers, and local or sectional societies with local officers, one society in each country represented.

2. The officers of the local societies may be elected annually or triennially, and shall consist of a president and secretary, and as many other officers as the local society shall decide. The officers of the International Association shall be as provided under the present constitution.

3. A local fee may be arranged at the discretion and option of the local society, but the international fee shall remain $2 (two dollars). It shall continue to be paid to the international secretary, and shall be devoted to the cost of the bulletin, the payment of international postage, and other international outlay.

4. The meetings of both the International Association and also of the sectional societies shall be reported in the bulletin, and all communications presented at all such meetings shall be available for publication in the bulletin. This will not preclude their publication elsewhere as well, nor is the editorial committee pledged to publish all papers presented at either the international or sectional meetings.

ARTICLE VI.—Meetings.

The meetings of the international body shall be held at the same place and time as the meetings of the International Congress of Medicine. The meetings of the sectional societies shall be held annually or more frequently, according to the decision of the individual society.

ARTICLE VII.—Transaction of Business.

All matters of general policy and interest shall be decided by a two-thirds majority vote of all the voting representatives present at a stated meeting. At such meetings nine members shall constitute a quorum.

The vote may be taken in the interim of the meetings by the Secretary by means of correspondence, and the matter submitted shall then be decided by the two-thirds majority vote of those voting.

Together with each stated meeting there shall be a session of the Executive Committee for the transaction of business. At such meetings four members shall constitute a quorum.

ARTICLE VIII.—Changes in the Constitution.

Amendments to the Constitution shall be decided by the two-thirds majority vote of the active members. Such measures to be proposed in writing to the Secretary, who shall submit them to the Executive Committee, and through these to the Association, either at the regular meeting or in the interim by means of correspondence.

BY-LAWS.

I.—Duties of Officers.

The President, Vice-President and Secretary-Treasurer shall discharge the duties usually assigned to these offices. The Secretary-Treasurer shall, in addition to these duties, call for and receive the written votes of all the voting representatives in all matters to be decided by correspondence in the interim between the regular meetings, and shall secure papers and addresses for the regular meetings and arrange the program therefor.

II.—The Editorial Committee.

A Committee on Publication, including the President and Secretary, *ex officio,* and three or more other members, shall be appointed every three years, who shall have as their duty the periodical publication of a Museum Bulletin.

III.—Changes in By-Laws.

A By-law may be amended by the two-thirds majority vote of the voting representatives, one month after the written notice of the proposed amendment has been received in writing.

OFFICERS AND MEMBERS OF THE INTERNATIONAL ASSOCIATION OF MEDICAL MUSEUMS.

MAY 1, 1915.

INTERNATIONAL OFFICERS.

President: Prof. Ludwig Aschoff, Freiburg, i. B., Germany.

First Vice-President: Prof. Arthur Keith, London, England.

Second Vice-President: Prof. Pierre Marie, Paris, France.

Third Vice-President: Prof. R. M. Pearce, Philadelphia, United States.

Councillors: Sir William Osler, Bt., Oxford, England; Prof J. G. Adami, Montreal, Canada; Prof. A. S. Warthin, Michigan, United States of America; Prof. B. Fischer, Frankfurt-am-Main, Germany; Prof. P. Courmont, Lyon, France; Prof. J. Fibiger, Copenhagen, Denmark; Prof. M. Askanazy, Geneva, Switzerland; Prof. Harbitz, Christiania, Norway; Dr. de Josselin de Jong, Rotterdam, Holland; Dr. Réné Sand, Belgium; Prof. G. Martinotti, Bologna, Italy.

Secretary-Treasurer: Dr. Maude E. Abbott, McGill University, Montreal, Canada.

Assistant Secretary-Treasurers: Dr. W. W. Francis, McGill University, Montreal, Canada; Dr. J. Kaufmann, McGill University, Montreal, Canada.

OFFICERS OF LOCAL SECTIONS.

Belgium: Dr. Réné Sand, Secretary and International Councillor.

France: Prof. Pierre Marie, President; Prof. Paul Courmont, First Vice-President and International Councillor; Prof. Gustav Roussy, Secretary.

Germany: Prof. Ludwig Aschoff, President; Prof. B. Fischer, Secretary, and Councillor on the International Body.

Great Britain: Sir Thomas Barlow, Hon. President; Prof. A. Keith, President, and International Councillor; Profs. Lorrain Smith, J. Ritchie and Walker Hall, Councillors; Dr. E. H. Kettle, Secretary.

Holland: Dr. Georgine Luden Van Heumen, President; Dr. de Josselin de Jong, First Vice-President, and International Councillor; Dr. Ariens Kappers, Secretary.

Italy: Prof. G. Martinotti, Councillor on the International Body.

Switzerland: Prof. Askanazy, President, and International Councillor; Prof. Hector Cristiani, Secretary.

United States and Canada: Prof. R. M. Pearce, President; Prof. A. S. Warthin, First Vice-President, and International Councillor; Dr. C.

F. Silvester, Second Vice-President; Prof. F. J. Shepherd, Third Vice-President; Profs. W. G. MacCallum, Leo Loeb (representing the American Society of Experimental Pathology), O. Klotz, H. E. Robertson and W. M. L. Coplin, Councillors; Dr. Maude E. Abbott, Secretary-Treasurer; Dr. Joseph Kaufmann and Dr. W. Francis, Assistant Secretaries.

ACTIVE MEMBERS.

(Organizing Members are indicated by a star.)

ADMITTED

AFRICA.

1912 Poujol, Prof., Dept. Path. Anat., University of Algiers, 111 Rue Michelet, Algeria.

AUSTRALIA.

1907 *Allen, Prof. H. B., Path. Museum, University of Melbourne, Melbourne.
1907 *Cavenagh-Mainwaring, Dr. W. R., Adelaide University, Adelaide, South Australia.
1913 Wilson, Prof. J. T., Anat. Dept. University of Sydney, Sydney.
1914 Armit, Dr. H. W., B. M. A. Building, 30 Elizabeth Street, Sydney.

AUSTRIA.

1910 Stoerck, Prof. O., Universität, Wien.
1907 *Weichselbaum, Prof. Anton, Uuniversität, Wien.

BELGIUM.

1914 Bertrand, Prof. L., 9 Rue Kiliaen, Antwerp.
1912 Duyse, Prof., University of Ghent, Ghent.
1912 Pirket, Prof. C., University of Liege.
1911 Sand, Dr. Réné, University of Brussels, Brussels, Belgium.

BRAZIL.

1910 deCruz, Prof. Oswaldo, Institute de Manguinhos, Rio de Janeiro.
1910 Thomas, Dr. Wolferstan, Institute Oswaldo de Cruz, Manaos.

CANADA.

1907 *Abbott, Dr. Maude E., Path. Museum, McGill University, Montreal.
1907 *Adami, Prof. J. G., McGill University, Montreal, Canada. (Honorary.)
1910 Birkett, Prof. H. S., 252 Mountain Street, Montreal.
1913 Bruère, Prof. A. A., Royal Victoria Hospital, Montreal.
1911 Burnham, Dr. F. W. E., 373 Broadway, Winnipeg, Man.

1910 Byers, Dr. Gordon, 346 Mountain Street, Montreal.
1910 Chipman, Prof. W. W., 285 Mountain Street, Montreal.
1913 Connell, Prof. W. T., Queen's University, Kingston, Ont.
1914 Fitzgerald, Prof. J. G., Hygiene, University of Toronto, Toronto, Ont.
1910 Francis, Dr. W. W., McGill University, Montreal.
1914 Geddes, Prof. A. C., Anat. Dept., McGill University, Montreal.
1910 Gurd, Dr. Fraser B., 406 McKay Street, Montreal.
1911 Higgins, Dr. C. H., Dept. Public Health, Ottawa, Ont.
1908 Judah, E. L., Esq., McGill University, Montreal
1910 Kaufmann, Dr. Joseph, McGill University, Montreal.
1914 MacCordick, Dr. A. H., Fellow in Path., McGill Univ., Montreal.
1914 Latreille, Dr. E., Laval University, Montreal.
1907 MacKenzie, Prof. J. J., University of Toronto, Toronto, Ont.
1914 Malone, Dr. R. H., McGill University, Montreal.
1914 McMurrich, Prof. A., Anat., University of Toronto, Toronto, Ont.
1913 Meakins, Dr. J. C., Royal Victoria Hospital, Montreal.
1914 Peirce, Dr. S. J., General Hospital, Winnipeg, Man.
1910 Popham, Dr. E. S., Manitoba Medical College, Winnipeg, Man.
1914 Rankin, Dr. A. C., University of Alberta, Edmonton, Alta.
1910 Saint-Jaques, Prof. Eugene, 29 Sherbrooke Street, West, Montreal.
1907 *Shepherd, Prof. F. J., 152 Mansfield Street, Montreal.
1914 St. Pierre, Dr. J. A., Laval University, Montreal.
1910 Todd, Prof. J. L., McGill University, Montreal.
1914 Vallée, Dr. A., Laval University, Montreal.
1911 White, Dr. E. Hamilton, 58 Crescent Street, Montreal.
1911 White, Dr. F. J., Moncton, N. B.
1915 Oertel, Dr. Horst, Department of Pathology, Royal Victoria Hospital, Montreal.
1910 Rhea, Dr. L. J., Department of Pathology, Montreal General Hospital, Montreal.

DENMARK.

1914 Ellermann, Prof. V., Medical Jurisprudence, University of Copenhagen.
1907 *Fibiger, Prof. Johannes, Frederic den 5tes Vej No. 11, Copenhagen.
1914 Folger, Prof. A. F., Path. Anat., Veterinary High School, Copenhagen.
1914 Jensen, Prof. C. O., Director of Serum Institute, Veterinary High School, Copenhagen.
1914 Madsen, Prof. T. H., Director of Serum Institute of State of Denmark, Copenhagen.
1914 Melchier, Dr. L., Prosector of Communal Hospital, Copenhagen.
1914 Paulli, Prof., Normal Anat., Royal Veterinary High School, Copenhagen.
1914 Salomonsen, Prof. C. J, Pathology, University of Copenhagen.
1910 Scheel, Dr. Victor, Commune Hospital, Copenhagen.

ENGLAND.

1914 Barlow, Sir Thomas, 10 Wimpole St., W. London.
1911 Andrews, Dr. F. W., St. Bartholomew's Hospital, London.
1911 Beattie, Dr. J. M., University of Sheffield, Sheffield.
1913 Chambers, Dr. Helen, London School of Medicine for Women, London.
1911 Delépine, Prof. Sheridan, Public Health Laboratory, Manchester.
1911 Gibson, Dr. A. G., Faculty of Medicine, Oxford University, Oxford.
1914 Frost, Mr. R. L., University of Sheffield, Sheffield.
1914 Hamilton, M., University College Museum, London.
1907 *Hall, Prof. J. Walker, University College, Bristol.
1911 Hicks, Dr. Braxton, Westminster Hospital, London.
1907 *Hunter, Prof. Wm., Charing Cross Hospital Museum, London.
1908 Izzard, Mr. F. A., The Medical Schools, Cambridge.
1913 Jones, Dr. F. Wood, London School of Medicine for Women.
1910 Keith, Prof. A., Royal College of Surgeons, London, W. C.
1911 Kettle, Dr. E. H., Path. Dept. St. Mary's Hospital, London.
1907 *Leith, Prof. R. F. C., Path. Museum, University of Birmingham, Birmingham.
1907 *Osler, Sim Wm., Oxford, (Honorary.)
1911 Paine, Dr. M., Cancer Research Hospital, London.
1913 Raw, Dr. Nathan, Mill Road Infirmary, Liverpool.
1911 Spilsbury, Dr. Bernard H., St. Mary's Hospital, London, W.
1910 Stevens, Dr. J. W. W., Liverpool School of Tropical Medicine, Liverpool.
1911 Thursfield, Dr. Hugo, St. Bartholomew's Hospital, London.
1911 Trevor, Dr. R. I., St. George's Hospital, London.
1911 Turnbull, Dr. Hubert, London Hospital, London.
1914 Wellcome, Mr. H. S., Historical Medical Museum, London.
1907 *Woodhead, Prof. G. Sims, Cambridge University, Cambridge.
1911 Gruner, Dr. O. C., 10 Belsize Gardens, Hampstead.

EGYPT.

1907 *The Director, Government School of Medicine, Cairo, (Prof. A. G. Ferguson, Representative.)
1913 Ruffer, Dr. M. A., Service Maritime Sanitaire d'Egypte, Alexandria.
1913 Wahby, Prof. B., Anatomical Department, Cairo.
1913 Willmore, Dr. J. G., Service Maritime Sanitaire d'Egypte, Alexandrie.

FRANCE.

1913 Courmont, Prof. Jules, Faculté de Médécine, Montpellier.
1910 Courmont, Prof. Paul, Faculté de Médécine, Lyon.
1911 Curtis, Prof. Ferdinand, Path. Anat., Faculté de Médécine, Lille.
1910 Marie, Prof. Pierre, Faculté de Médécine de Paris, Paris.
1911 Ménétrier, M., Medicin des Hôpitaux, Paris.

1913 Nicolas, Prof. Guillaume, Faculté de Médécine, Lyon.
1913 Paviot, Prof. J. N., Faculté de Médécine, Université de Lyon, Lyon.
1911 Rist, Dr. Edouard, Hopital Laennec, Paris.
1910 Roussy, Prof. Gustav, Faculté de Médécine, Université de Paris, Paris.
1913 Sabrazes, Prof. Jean, Faculté de Médécine, Université de Bordeaux, Bordeaux.

GERMANY AND AUSTRIA.

1914 Adelheim, Dr. R., 11 Städtisches Krankenhaus, Riga.
1914 Albrecht, Prof. Dr. H., Pathologisches Institut, Graz.
1907 *Aschoff, Geheimrath, Prof. Dr., Patholog. Institut, Freiburg, i. Br.
1914 Bostroem, Geheimrath, Prof. Dr., Patholog. Institut, Giessen.
1911 Borst, Prof. Max, Patholog. Institut, München.
1910 Chiari, Prof. Dr. Hofrat Hans, Patholog. Institut, Strassburg.
1914 Dürk, Prof. H., Patholog. Institut, München.
1914 Aber, Prof. Dr., Veterinär-Institut, Leipzig.
1914 Ernst, Prof. Dr. P., Patholog. Institut, Heidelberg.
1911 Fischer, Prof. Dr. B., Senckenbergisches Institut, Frankfurt-am-Main.
1914 Funncius, Dr. B., Städt. Krankenanstalten, Elberfeld.
1914 Ghon, Prof. Dr. A., Patholog. Institut, Prag.
1910 Herzheimer, Prof. Dr. G., Städt. Krankenhaus, Weisbaden.
1914 Joannovicz, Dr. G., Wien ix. 3 Kinderspitalgasse 15.
1914 Kitt, Prof. Dr., Patholog. Institut d. Tierärztlichen Hochschule, München.
1910 Kretz, Prof. Dr. R., Rudolfspital, Wien.
1914 Krompecher, Prof. Dr. E., Patholog. Institut, Budapest I.
1914 Loehlein, Prof. Dr. M., Patholog. Institut, Charlottenburg-Westend.
1910 Lubarsch, Prof. Dr., Kiel.
1914 Maresch, Dr. R., Prosektor am Rudolfspital, Wien.
1914 Meyer, Prof. Dr. R., Patholog. Institut, Universitätsfrauen-Klinik, Berlin.
1914 Mönckeberg, Prof. Dr. J. G., Akademie f. Medicine, Düsseldorf.
1913 Oberndorfer, Prof. Dr. Siegfried, Krankenhaus München-Schwäbing, München.
1913 Ornstein, Dr. Otto, Institut f. Infectionskrankheiten, Berlin.
1914 Paskziewicz, Dr. L., Städt. Krankenhaus Praga, Warschau.
1907 *Pick, Prof. Dr. Ludwig, Städt. Kranken-Friedrichshain, Berlin.
1914 Raubitschek, Dr., Landeskrankenenstalt, Czernowitz.
1914 Reinhardt, Dr. Ad., Patholog. u. bakter. Institut, d. Krankenhauses St. Georg, Leipzig.
1914 Risel, Prof. Dr. W., Patholog. bakter. Institut d. Kgl. Krankenhaus, Zittau.
1914 Rocha-lima, Dr. H. da, Institut fur Tropenkrankheiten, Hamburg.
1914 Rossle, Prof. Dr. H., Patholog. Institut, Jena.
1914 Schmidt, Prof. Dr. M. B., Patholog. Institut, Würzburg.

1914 Schwalbe, Prof. Dr. E., Patholog. Institut, Rostock.
1913 Spalteholz, Prof. Dr. Werner, Anatomisches Institut, Leipzig.
1914 Steinbiss, Dr., Bielefeld-Bethel.
1914 Wehrsig, Dr. Städtisches Prosektur, Aachen.
1914 Wolhardt, Prof. Dr. D., Städtisches Krankenhaus, Mannheim.
1914 Zieler, Prof. Dr., Dermatologisches Klinik, Würzburg.

HOLLAND.

1910 de Jong, Prof. de Josselin, University of Rotterdam, Rotterdam.
1913 Kappers, Dr. C. U. Ariens, Amsterdam, (Mauritskad 81).
1911 Spronck, Prof. C. H. H., University of Utrecht, Utrecht.

IRELAND.

1907 *McWeeney, Prof. E. J., Museum of the Mater Misericordiae Hospital, Dublin.
1911 Mettam, Prof. A. E., Royal Veterinary College of Ireland, Dublin.

ITALY.

1914 Banti, Prof. G., Patologia, Universita di Firenze, Firenze.
1911 Bonome, Prof. A., Inst. Anat. Path. della r. Univ. di Padua.
1914 DeVecchi, Prof. Binde, Libere docente, Institut. do Anat. Pathological, Bologna.
1914 Devoto, Prof., Clin. dell. Mal. Professionel, Milan.
1914 Foa, Prof. F., Patologia, Universita di Torino.
1914 Guerrini, Prof. Guido, Pat. Comparate, Scuela superiore Med. Veterinaria, Milane.
1911 Guizzeto, Prof. Pietro, Inst. do Anat. Path., Univ. di Parma.
1914 Marchiafava, Prof. E., Patologia, Universita di Roma.
1910 Martinotti, Prof. G., Anat. Path. Dept., University of Bologna.
1907 *Monti, Prof. Achille, Museum of Path. Anat., University of Pavia.
1914 Ravenna, Prof., Anat. Pat. Scuele Superiore Med. Veterinaria, Modena.
1914 Tarozzi, Prof., Anat. Pat., University di Modena.
1914 Veratti, Dr. R., Anat., Universita di Pavia.
1914 Zanotti, Dr., Patologia, Universita di Bologna.

JAPAN.

1911 Fujinami, Prof. A., Pathological Department, Imperial University, Kioto.

NORWAY.

1908 Harbitz, Prof. Francis, University of Christiania.

PHILIPPINE ISLANDS.

1908 Barber, Dr. J. R., Manila.
1910 Crowell, Dr. B. C., Bureau of Science, Manila.

SCOTLAND.

1913 Henderson, Mr. E. J., Anat. Dept. University of Edinburgh, Edinburgh.
1908 Miller, Dr. James, New School of Medicine, Bristo Street, Edinburgh.
1907 *Muir, Prof. Robert, Pat. Museum of the Western Infirmary, Glasgow.
1913 Muir, Mr. Richard, University of Edinburgh, Edinburgh.
1907 *Ritchie, Prof. J., Laboratory, 2 Forrest Road, Edinburgh.
1911 Smith, Prof. Louan, University of Edinburgh, Edinburgh..
1907 *Sutherland, Prof. L. R., University of St. Andrews, Dundee.
1911 Teacher, Dr. John H., Hunterian Museum, Glasgow.
1911 Wade, Mr. Henry, Museum Royal College of Surgeons, Edinburgh.

SWITZERLAND.

1907 *Askanazy, Prof. M., Université de Gèneve, Gèneve.
1914 Beitke, Prof., Pathologie, Universitate de Lausanne, Lausanne.
1914 Cristiani, Prof., Université de Gèneve, Gèneve.
1914 Eternod, Prof., Histologie, Université de Gèneve.
1914 Felix, Prof., Anatomie, Universität Zurich.
1914 Huguenin, Prof., Pathologie, Veterinär-Med., Universitat Bern.
1914 Kolle, Prof., Anatomie, Universtät Berne.
1914 Laskowski, Prof., Anatomie, Université de Genève.
1914 Wegelin, Prof., Pathologie, Universität Bern.

SWEDEN.

1910 Forssman, Prof. Magnus J. K. A., University of Lund.
1910 Quensel, Prof. J. A. T., University of Upsala, Upsala.
1910 Sundberg, Prof. Carl, Karolinska Medico Kirurgiska Instit.

UNITED STATES OF AMERICA.

1907 *Albert, Prof. Henry, University of Iowa, Iowa City.
1914 Brigham, Dr. W. Curtis, Los Angeles, Cal.
1914 Baehr, Dr. George, Mount Sinai Hospital, New York.
1911 Bartlett, Dr. C. J., Yale University, New Haven, Conn.
1912 Bell, Prof. E. T., University of Minnesota, Minneapolis, Minn.
1913 Bernstein, Dr. H. S., Albany Medical School, New York.
1915 Bunting, Prof. C. H., University of Wisconsin, Madison, Wis.
1908 Cone, Prof. Claribel, Women's Medical College of Baltimore.

1907 *Coplin, Prof. W. M. L., Jefferson Medical College, Philadelphia, Pa.
1913 Craig, Dr. J. B., Albany Medical College, New York.
1914 Cushing, Prof. Harvey, Harvard Medical School, Boston, Mass.
1914 Cullen, Dr. T. S., Johns Hopkins Hospital, Baltimore.
1914 Dolley, Dr. D. H., University of Missouri, Columbia, Mo.
1914 Donaldson, Dr. H. H., Wistar Institute, Philadelphia, Pa.
1908 Duval, Prof. C. W., Tulane University, New Orleans, La.
1913 Flint, Prof. J. M., University of Yale, New Haven, Conn.
1914 Garside, Dr. C. Z., Fordham University, New York.
1907 *Gaylord, Dr. Harvey, Institute for Study of Malignant Diseases, 113 High Street, Buffalo, N. Y.
1914 Greenman, Dr. M., Wistar Institute, Philadelphia, Pa.
1913 Goff, Dr. H. N., 3580 Fifth Street, San Diego, Cal.
1911 Harris, Dr. D. L., Hospital Department, St. Louis, Mo.
1914 Haythorne, Dr. S. R., Alleghany Hospital, Pittsburg, Pa.
1910 Hewitt, Dr. J. H., Baylor University Medical School, Dallas, Texas.
1914 Hillman, Dr. O. :., New York Post-Graduate Medical School, New York.
1908 Hirsh, Dr. J. L., University of Maryland, Baltimore, Md.
1914 Karsner, Prof. Howard, Harvard Medical School, Boston, Mass.
1914 Koelmer, Dr. J. A., University of Pennsylvania, Philadelphia, Pa.
1914 Kingsford, Dr. H. H., Dartmouth Medical School, Hanover, N. H.
1908 Klotz, Prof. Oskar, University of Pittsburg, Pittsburg, Pa.
1907 *Lamb, Dr. D. S., Army Medical Museum, Washington, D. C.
1913 Lambert, Dr. R. A., College of Physicians and Surgeons, New York.
1913 Larsen, Dr. W. P., University of Minnesota, Minnesota.
1907 *LeCount, Prof. E. R., Chicago University, Chicago, Ill.
1910 Lee, Prof. Thos. G., Institute of Anatomy, University of Minnesota, Minn.
1908 Libman, Dr. Emanuel, Mount Sinai Hospital, New York.
1910 Loeb, Prof. Leo, Barnard Free Skin and Cancer Hospital, St. Louis.
1913 Luden von Heumen, Dr. Georgine, Mayo Clinic, Rochester, Minn.
1910 Maddox, Dr. R. D., Cincinnati, Ohio, (409 Broadway).
1907 *MacCallum, Prof. W. G., Department Pathology, College of Physicians and Surgeons, 437 West 59th Street, New York.
1907 *MacFarland, Prof. Jos., Medico-Chirurgical College of Philadelphia, Philadelphia, Pa.
1915 Mallory, Prof. F. B., Department of Pathology, Harvard Medical School, Boston, Mass.
1910 Mandelbaum, Dr. F. S., Mount Sinai Hospital, New York.
1914 Manwaring, Prof. W. H., Leland Stanford University, Leland, Cal.
1913 Marshall, Prof. Harry T., University of Virginia, Charlotte, Va.
1913 McClure, Prof. C. F. W., Anatomy, University of Princeton, Princeton, N. J.
1911 Milne, Dr. Lindsay, Suite 816, Rialto Building, 9th Street and Grand Avenue, Kansas City, Mo.
1914 Moore, Dr. Veranus A., Ithaca, N. Y.

1915 Morse, Dr. Plinn, 48 Nicolet Avenue, Detroit, Mich.
1914 Murray, Dr. Archibald, Hoagland Laboratory, 335 Henry Avenue, Brooklyn, N. Y.
1914 Norris, Dr. Chas., Bellevue Hospital, New York.
1907 *Ophüls, Prof. W., Lane Hospital, San Francisco, Cal.
1911 Opie, Prof. Eugene L., Washington University Medical School, St Louis, Mo.
1907 *Pearce, Prof. R. M., Department Research Medicine, University of Pennsylvania, Philadelphia, Pa.
1911 Robertson, Dr. H. E., Institute Public Health and Bacteriology, University of Minnesota, Minneapolis, Minn.
1911 Robinson, Dr. J. L., 2015 Franklin Street, Waco, Texas.
1915 Rosenberger, Dr. Randle C., Hygiene and Bacteriology, Jefferson Medical College, Philadelphia.
1912 Rusk, Dr. G. Y., Curator, Museum of Hearst Laboratory of Pathology, University of California, Berkeley, Cal.
1908 Russell, Major F. F., 39 Whitehall Street, New York, N. Y.
1914 Sappington, Dr. S. W., 134 S. 16th Street, Philadelphia, Pa.
1914 Silvester, Dr. C. F., Anatomy, Princeton University, Princeton, N. J.
1907 *Smith, Prof. A. J., University of Pennsylvania, Philadelphia, Pa.
1908 Snow, Dr. W. F., Leland Stanford University, Santa Clara County, California.
1907 *Souchon, Prof. Edmund, Tulane University, New Orleans, La.
1913 Sprunt, Dr. T. P. Johns Hopkins Hospital, Baltimore, Md.
1908 Stokes, Dr. W. R., College of Physicians and Surgeons, Baltimore, Md.
1910 Strong, Dr. R. P., Department of Tropical Medicine, Harvard Medical School, Boston, Mass.
1915 Sundwall, Prof. John, University of Kansas, Lawrence, Kans.
1911 Symmers, Dr. Douglas, Carnegie Laboratory, 338 E. 26th Street, New York, N. Y.
1915 Terry, Dr. R. J., Washington University Medical School, St. Louis, Missouri.
1914 Weiskotten, Dr. W. G., Medical College, Syracuse, N. Y.
1914 Wells, Dr. H. G., University of Chicago, Chicago, Ill.
1913 Winternitz, Dr. M. C., Johns Hopkins Hospital, Baltimore, Md.
1910 Warren, Prof. Collins, 58 Beacon Street, Boston, Mass.
1907 *Warthin, Prof. A. S., University of Michigan, Ann Arbor, Mich
1908 Watters, Prof. H., Boston University School of Medicine, Boston, Mass.
1915 Weller, Dr. Carl V., University of Michigan, Ann Arbor, Mich.
1910 Whipple, Dr. G. H., Johns Hopkins Hospital, Baltimore, Md.
1907 *Whitney, Prof. Wm. F., Warren Anatomical Museum, Harvard Medical School, Boston, Mass.
1912 Williams, Prof. H. U., University of Buffalo, Buffalo, N. Y.
1910 Wilson, Dr. L. B., Rochester, Minn.
1910 Wolbach, Prof. S. B., Harvard Medical School, Boston, Mass.

1907 *Waite, Dr. H. H., Omaha Medical College, University of Nebraska, Lincoln, Neb.

1910 Wollstein, Dr. Martha, Babies' Hospital, New York, N. Y.

1908 Woolley, Prof. Paul G., University of Cincinnati, Cincinnati, O.

MEMBERS DECEASED.

1907 *Major James Carroll, M.D. Curator, Army Medical Museum, Washington, D. C., Chairman of the Organizing Committee, and first president of the Association. Born, June, 1854. Died, September 16th, 1907.

1911 Leonard Worcester Williams, A.M., Ph.D. Instructor in Comparative Anatomy, Harvard Medical School, Boston. Born, July, 1875. Died, September 26th, 1912.

1907 *Sir Jonathan Hutchinson, F.R.C.S. Consulting Surgeon to the London Hospital, and Emeritus Professor of Surgery in the Medical College, London, England Born, July 23rd, 1828. Died, June 23rd, 1913.

1914 Charles Sedgwick Minot, D.Sc., LL.D., Professor of Anatomy, Harvard Medical School, Boston. Born, December 23rd, 1852. Died, November 19th, 1914.

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